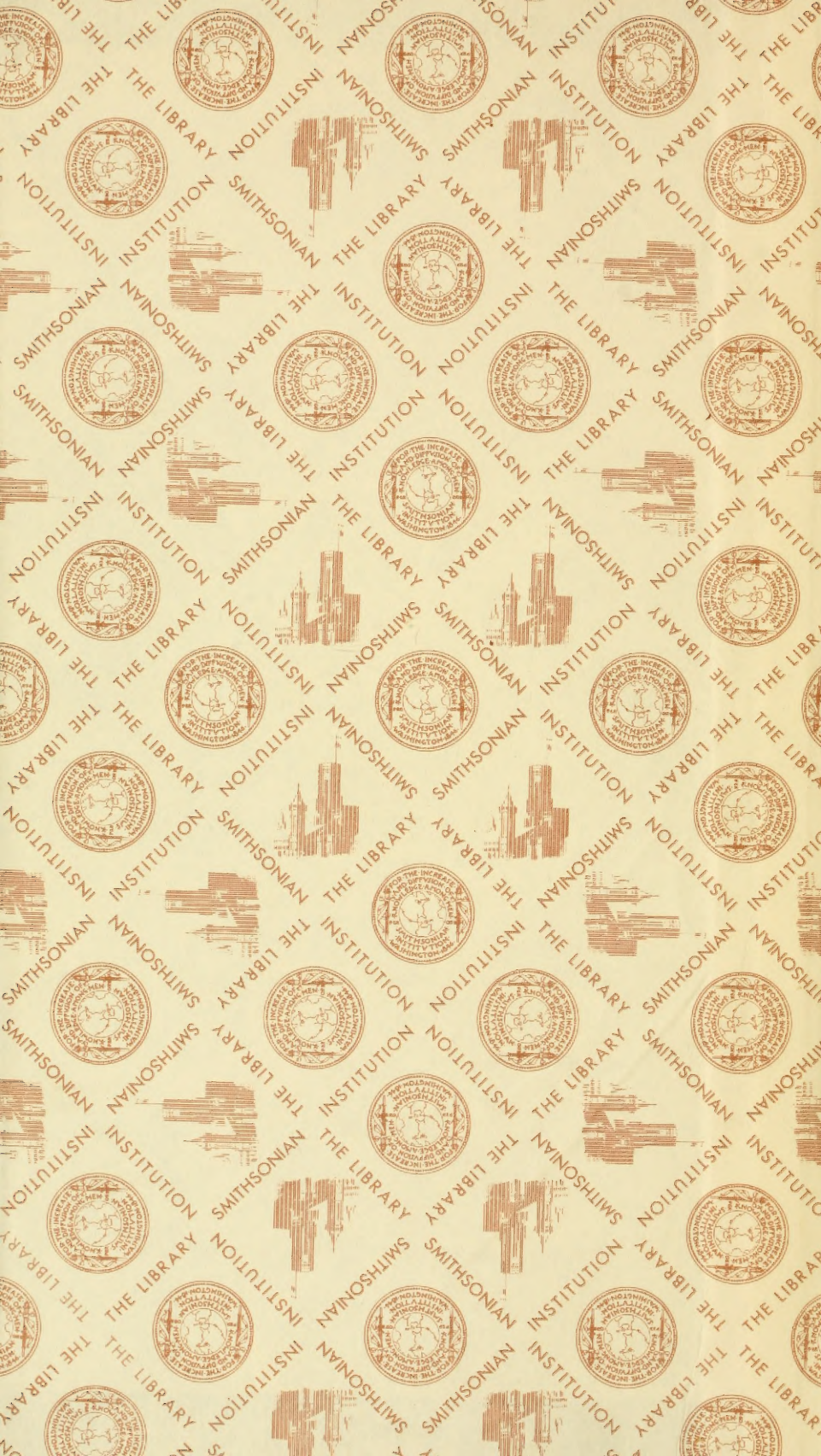
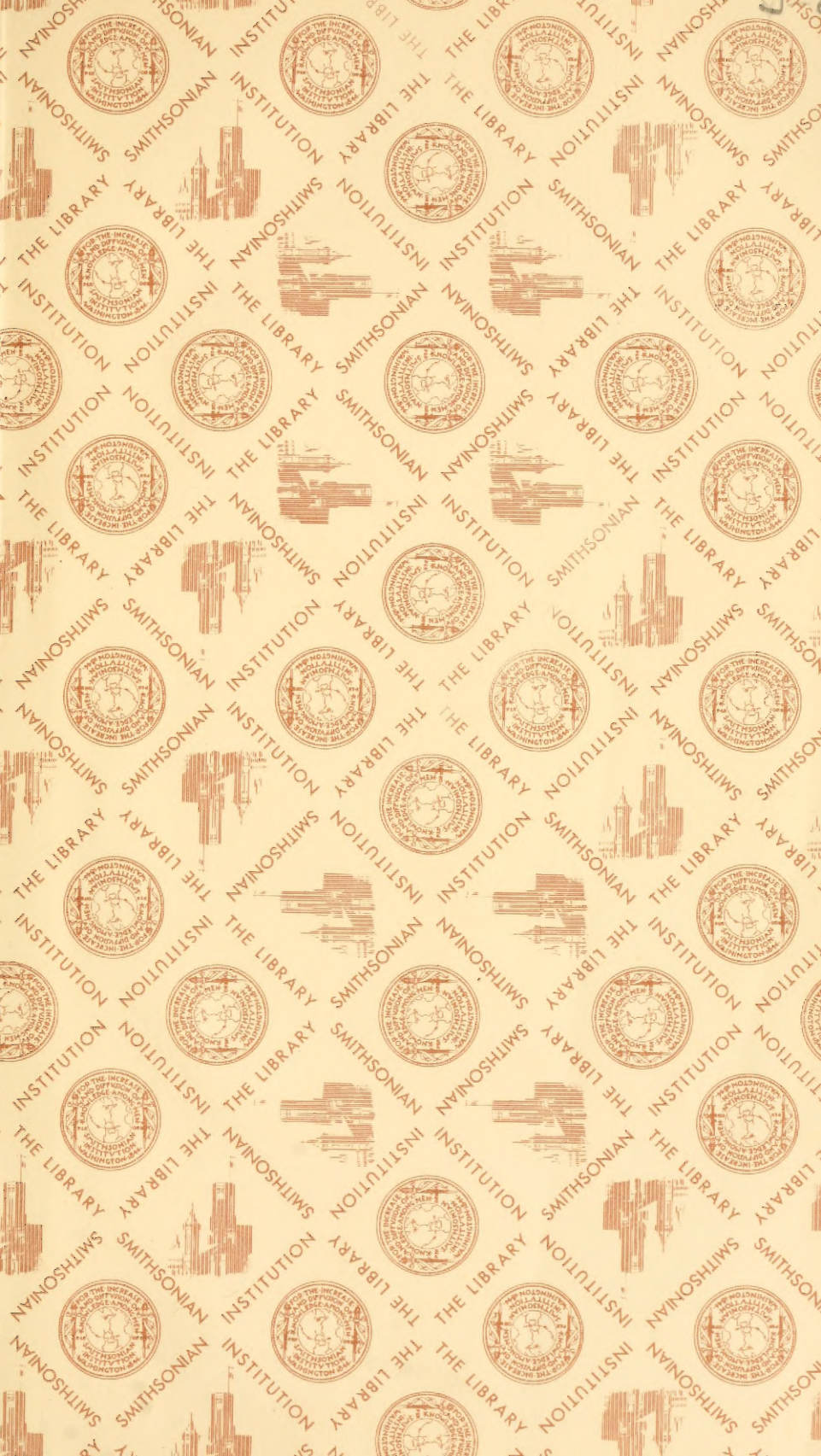


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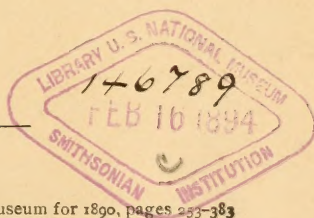
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THE HUMMING BIRDS.

BY

ROBERT RIDGWAY,

Curator, Department of Birds.



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THE HUMMING BIRDS.

By ROBERT RIDGWAY.

INTRODUCTION.

Minutest of the feathered kind,
Possessing every charm combin'd,
Nature, in forming thee, design'd
That thou shouldst be

A proof within how little space
She can comprise such perfect grace,
Rendering thy lovely fairy race
Beauty's epitome.

Thou burnished colors to bestow,
Her pencil in the heavenly bow
She dipp'd, and made thy plumes to glow
With every hue.

—CHARLOTTE SMITH.

Of all the numerous groups into which the birds are divided there is none other so numerous in species, so varied in form, so brilliant in plumage, and so different from all others in their mode of life. Inhabitants exclusively of the tropical and temperate portions of America, they constitute the most charming element in the wonderfully varied bird-life of the New World. Buffon considers the Humming Bird "of all animated beings . . . the most elegant in form and brilliant in color. The stones and metals polished by art are not comparable to this gem of nature. She has placed it in the order of birds, but among the tiniest of the race—*maxime miranda in minimus*; she has loaded it with all the gifts of which she has only given other birds a share. Agility, rapidity, nimbleness, grace, and rich attire all belong to this little favorite. The emerald, the ruby, and the topaz glitter in its garb, which is never soiled with the dust of earth, for, leading an ærial life, it rarely touches the turf even for an instant. Always in the air, flying from flower to flower, it shares their freshness and their splendor, lives on their nectar, and only inhabits those climates in which they are unceasingly renewed." Audubon calls the Humming Bird a "glittering fragment of the rainbow," and asks: "Who, on seeing this lovely little creature mov-

ing on humming winglets through the air, suspended as if by magic in it, flitting from one flower to another, with motions as graceful as they are light and airy, pursuing its course and yielding new delights wherever it is seen . . . would not pause, admire, and turn his mind with reverence toward the Almighty Creator, the wonders of whose hand we at every step discover, and of whose sublime conception we everywhere observe the manifestations in his admirable system of creation?"

Buffon's characterization, however, is somewhat inaccurate and slightly overdrawn, since nature has *not* endowed Humming Birds "with all the gifts of which she has only given other birds a share," the absence of melodious voice being, as a rule, a conspicuous deficiency of the tribe, while the statement that they are "always in the air" is very inaccurate, Humming Birds requiring the same repose which other kinds find necessary.

The author of that magnificent work, "A Monograph of the Trochilidæ"—Mr. John Gould—in recounting his own experience with Humming Birds, if less extravagant in his praise of them is no less enthusiastic in his admiration. "That early impressions of the mind," says he, "are vividly retained, while events of the day flit from our memory, must have been experienced by everyone. How vivid, then, is my recollection of the first Humming Bird which met my admiring gaze! With what delight did I examine its tiny body and feast my eyes on its glittering plumage! This early impression, I well remember, gradually increased into an earnest desire to attain a more intimate acquaintance with the lovely group of birds to which it pertained, and was still further strengthened when an opportunity was afforded me of inspecting the, at that time, unique collection of the *Trochilidæ* formed by the late Mr. George Loddiges, of Hackney. This gentleman and myself were imbued with a kindred spirit in the love we both entertained for this family of living gems. To describe the feeling which animated us with regard to them is impossible. It can, in fact, only be realized by those who have made natural history a study, and who pursue the investigation of its charming mysteries with ardor and delight. That our enthusiasm and excitement with regard to most things become lessened, if not deadened, by time, particularly when we have acquired what we vainly consider a complete knowledge of the subject, is, I fear, too often the case with most of us; not so, however, I believe, with those who take up the study of the family of Humming Birds. Certainly I can affirm that such is not the case with myself; for the pleasure which I experience on seeing a Humming Bird is as great at the present moment as when I first saw one. During the first 20 years of my acquaintance with these wonderful works of creation my thoughts were often directed to them in the day, and my night dreams have not unfrequently carried me to their native forests in the distant country of America.

"In passing through this world I have remarked that when inquirers

of a strong will really set themselves to attain a definite object they generally accomplish it; and in my own case the time at length arrived when I was permitted to revel in the delight of seeing the Humming Birds in a state of nature, and to observe their habits in the woods and among the great flowering trees of the United States of America and in Canada."

It is not the naturalist alone, however, who has been attracted by the wonderful beauty of Humming Birds. The demand for them is great for purely ornamental purposes, and though this has vastly added to their destruction it has, as a fortunate recompense, enabled naturalists to become better acquainted with them, the immense number of specimens often contained in milliners' and taxidermists' stocks frequently yielding species which otherwise would scarcely have become known to science. "Both Frenchmen and Belgians," says Mr. Gould, "have proceeded to South America to procure supplies of these birds, and dealers from those countries have established themselves in some of the cities of that part of the world for the like purpose. From Sta. Fé de Bogota alone many thousands of skins are annually sent to London and Paris, and sold as ornaments for the drawing-room and for scientific purposes. The Indians readily learn the art of skinning and preserving, and, as a certain amount of emolument attends the collecting of these objects, they often traverse great distances to procure them; districts more than a hundred miles on either side of Bogota are strictly searched; and hence it is that from these places alone we receive not less than seventy species of these birds. In like manner the residents of many parts of Brazil employ their slaves in collecting, skinning, and preserving them for European markets, and many thousands are annually sent from Rio de Janeiro, Bahia, and Pernambuco. They also supply the inmates of the convents with many of the more richly colored species for the manufacture of artificial feather-flowers." Vast numbers are also used by the natives of Mexico in producing the wonderful feather pictures for which the descendants of the Aztecs are famous.

Regarding the method by which specimens of these diminutive birds are obtained by the collector, there exists much popular misunderstanding. "Many really absurd statements," says Mr. Gould, "have been made as to the means by which these birds are obtained for our cabinets. It is most frequently asserted that they are shot with water or with sand. Now, so far as I am aware, these devices are never resorted to, but they are usually procured in the usual way, with Nos. 10 and 11 shot, those being the sizes best suited for the purpose. If smaller shot be used the plumage is very frequently so cut and damaged that the specimen is rendered of little or no value. By far the greater number fall to the clay ball of the blowpipe, which the Indians, and in some instances even Europeans, use with perfect certainty of aim. . . . In Brazil very fine nets are employed for this purpose, but how

this engine is employed I am unable to state. Unfortunately for me many specimens of the fine species *Cometes sparganurus** in my possession have been obtained by means of birdlime, and this is evidently the way in which these birds are captured in the neighborhood of Chuquisaca."

On account of the immense destruction of Humming Birds for the various ornamental purposes mentioned above, certain species are said to be on the verge of extinction. The wonder is that they are not long ago extinct, for the number of individuals which have been destroyed is simply beyond computation. Three thousand skins of the Ruby-and-topaz Humming Bird (*Chrysolampis moschitus*) alone are said to have been shipped from a Brazilian port in a single consignment, while at a public sale of bird skins, held in London, March 21, 1888, more than 12,000 Humming Bird skins were disposed of! And in one week during the same year, there were sold at auction in London 400,000 Humming Birds, and other birds from North and South America, the former doubtless comprising a very considerable percentage of the whole number.† Surely this stupendous slaughter foreshadows the speedy extermination of many species. If it does not, what a commentary on the amazing wealth of bird-life in the tropics of America!

EARLY HISTORY.

Humming Birds being one of the special products of the New World, and consequently unknown to the ancients,‡ it of course follows that their literature is confined to the period following the discovery of America by Columbus. According to Lesson, "The first mention which is made of Humming Birds in the narratives of adventurers who proceeded to America, not with the design of studying its natural productions, but for the discovery of gold, dates from 1558, and is to be found in *Les Singularités de la France Antarctique* (Brazil) of André Thevet and Jean de Léry, companions of La Villegaignon, who attempted in 1555 to found a French colony there; but these superficial accounts would not have unfolded their natural history had not the old naturalists who published their observations at the commencement of the seventeenth century taken care to make them better known; and we find some good accounts of them in the voluminous compilation of Nieremberg, in the collection of fragments from the great works of Hernandez or Fernandez, and in those of Piso. Ximenez, Acosta, Gomara, Maregrave, Garcilasso, and Dutertre often mention

* For a description of this exquisitely beautiful bird see pages 308, 309.

† This information is taken from *The Auk*, July, 1888, pp. 334, 335.

‡ It is true that the name of the typical genus (*Trochilus*), from which the name of the family (*Trochilidae*) is taken, is a classical Greek name, *Τρόχιλος*, *trochilus* or *trochilos*; but the bird so called by Herodotus was the Crocodile bird (*Pluvianus aegyptius*), a small, ploverlike bird, which is said to feed upon the leeches which fasten themselves to the crocodile, even entering the monster's open mouth to do so.

these birds, but their remarks are so superficial that it would be of little use to quote them now. Towards the end of the same century Sir Hans Sloane, Catesby, Edwards, Brown, Father Labat, Plumier, Louis Feuillée, and Rochefort gave tolerably complete figures and descriptions of some of the species, but it was not until the commencement of the eighteenth century that we became better acquainted with their natural history." The naturalist-traveler Maregrave minutely described several species of Humming Birds in his *Natural History of Brazil*,* published in Amsterdam in 1648, an entire chapter (IV, pp. 196–198) being devoted to these birds under the heading of "Various species of Guainumbi" (*Guainumbi varie species*), *Guainumbi* or *Guinambi* being the Brazilian name for a Humming Bird, as are also, in the language of separate tribes, the terms *Aratica* and *Aratarataguacu*. Humming Birds were also well described by César de Rochefort in his *Histoire Naturelle et Morale des Îles Antilles de l'Amérique* (published in 1658), in which also they were allotted a special chapter (Article XVII, pp. 176–181).

The earliest notice of the common Ruby-throated Humming Bird (*Trochilus colubris*) of eastern North America that I have been able to find is an extract from "a letter written from Boston in New England, October 26, 1670," by John Winthrop, Esq., governor of Connecticut, to Francis Willughby, Esq., and published in the *Philosophical Transactions*, vol. VI (1671), p. 2223. It refers to a nest and two eggs, evidently a great curiosity at that time, as the article which follows will show:

I send you withal a little Box, with a Curiosity in it, which perhaps will be counted a trifle, yet 'tis rarely to be met with even here. It is the curiously contrived Nest of a Humming Bird,† so called from the humming noise it maketh whilst it flies. 'Tis an exceeding litle Bird, and only seen in Summer, and mostly in Gardens, flying from flower to flower, sucking Honey out of the flowers as a Bee doth; as it flieth not lighting on the flower, but hovering over it, sucking with its long Bill a sweet substance. There are in the same Nest two of that Birds Eggs! Whether they use to have more at once, I know not. I never saw but one of these Nests before; and that was sent over formerly, with some other Rarities, but the Vessel miscarrying you received them not.

Twenty-two years later, there appeared in the same journal (*Philosophical Transactions*, vol. XVII, 1693, pp. 760–761), what seems to be the first special description of the bird itself, entitled "The description of the American Tomineus or Humming Bird, communicated by Nehemiah Grew, M. D. and Fellow of the Royal Society," which also is worth quoting in full, the description having been written "by Mr. Hamersly, of Coventry:"

* *Historia Natvralis Brazilie, Auspicio et Beneficio Illustriss. I. Mavritii Com. Nassav. [etc.].* By Guilelmi Pisonis, M. D., and Georgi Maregravi de Liebstad.

† Of which see a notable Description in the *History of the Antiles* l. 1. 6. 15. art. 17, where it hath the name of *Colibry*.

‡ These Eggs were so small, that being weighed by the Publisher, the one weighed but about 5 grains, the other 3½: And the whole Nest weighed no more than 24 grains.

There is in most parts of *America* a Bird called by the *English* the *Hum Bird*, by the *Spaniard* *Tomineus*. He is of the most shining green Color [*sic*], and very resplendent; the Colour [*sic*] doth something resemble some of our *English* *Drake-heads*. It doth inhabit some of the colder parts of *America*, as well as in the hotter. It is the least of all Birds that I have seen there or in *England*; her Leg and Foot together is but half an Inch, the other parts answerable, and the Trunk of her Body not an inch. I did weigh one (in those parts) as soon as ever it was kill'd, whose Weight was the tenth part of an Ounce *Avoirdupoise*, which I take to be about the weight of a Coined Six-pence. And I have weighed here in *England* a *Tit-mouse* (which I take to be the least Bird here), and it weighed above Two Shillings, and some Half a Crown. I saw one of these Nests made of Cotton-Wool, in form and bigness of the Thumb of a Man's Glove, with the Taper end set downwards, wherein were two Eggs of the bigness of a Pea, of oval Form. Who can but admire to see the whole Body, and all the parts of a Bird folded up in an Egg, little bigger than a Pepper-Corn? They feed by thrusting their Bill and Tongue into the blossoms of Trees, and so suck the sweet Juice of Honey from them; and when he sucks he sits not, but bears up his Body with a hovering Motion of his Wings: But for the relation that he is a curious singing Bird, I think it untrue. God in many of his Creatures is bountiful, yet not lavish; for I did observe them several years, but never heard them sing; and the Peacock and Jay, though they be of a fine Plume, yet no Singers; and so I think this Bird is so beautiful to the Eye, as not to please the Ear. An *Indian* *Saggamore* is not in his full Pomp and Bravery without one of these Birds in his Ear for a Pendant. He is called the *Hum-Bird* or *Humming-Bird*, because some say he makes a noise like a Spinning Wheel when he flies, which I think rather an Imagination than real; for I have been many times very near them, both when they hover'd and when they did fly, and I never heard any Noise; besides, their Body and Wings are too small to strike Air enough to make any Noise.* But of this I shall not be positive, because some Authors are opposite to me. It is a Solitary Bird: I never saw but two at a time together, *viz.* the Male and the Female, they being easily known when together, the Male being somewhat bigger than the Female.†

If one takes a small Bird's Wing, and stand 4 or 5 yards from a Candle (when dark) and open the Wing, and look thro' it at the Candle, he may see a most elegant Colour of red and green, which green doth something resemble the Colour of this Bird.

The technical literature pertaining to Humming Birds is very extensive, perhaps exceeding in the number of separate titles that of any other group. "Most of it," says Dr. Coues, "is 'special,' that is, represented by books and papers exclusively devoted to this group of birds." "Hummers," says the learned bibliographer just quoted, "are very peculiar birds, and their study may almost be said to form a particular department of ornithology; in fact, the word 'trochilidist' has been coined to designate those who pay special attention to this branch of science; and there are few ornithologists who, however great their general acquirements, can be considered experts in this study.‡"

* Perhaps the writer's hearing was defective.

† Another error; the reverse being the case when there is any difference in size between the sexes. It is singular he did not notice the difference of color between the sexes, the brilliant ruby throat of the male being so conspicuous an ornament.

‡ Third Installment of American Ornithological Bibliography. By Dr. Elliott Coues, U. S. A. Bulletin of the U. S. Geological and Geographical Survey of the Territories, vol. v, No. 4, 1879, p. 690.

In this exceedingly useful work, there are given under the heading of *Trochilidae* (pp. 659-690) nearly three hundred separate titles, which shows how favorite a fam-

The extent to which our knowledge of Humming Birds has grown may be realized when it is considered that in 1758, when the tenth edition of Linnaeus's *Systema Naturæ* was published, only eighteen species were known, while at the present time the total number of recognizable species and subspecies is not far from five hundred. The gradual evolution of our knowledge on the subject is thus outlined by Dr. Coues in the bibliography from which we have previously quoted:

In 1758, when Linnaeus applied his system consistently to birds, in the tenth edition of the *Systema Naturæ*, he used the classic word *Trochilus* for a genus coextensive with the modern family *Trochilidae*, and catalogued 18 species, mostly based upon descriptions or figures furnished by Seba, Brown, Sloane, Catesby, Edwards, Clusius, and Albin, with references also to the *Mus. Ad. Fr.* In the twelfth edition, 1766, this number was increased to 22, with many additional references, as to Maregrave, Willughby, Ray, and especially Brisson.

In 1760, the last-named famous ornithologist gave us what may be deemed the first extended or in any sense "monographic" account of *Trochilidae*. Studiously collating the already numerous notices scattered through works of the character I have mentioned, as well as through the illustrated and other natural history treatises of his predecessors in ornithology, he was enabled to describe with his customary elaboration no fewer than 36 species and to present a copious bibliography. He also made the first tenable genera of Hummers after *Trochilus*, dividing the whole family into two groups, *Polytmus* and *Mellisuga*, one containing large species with curved bills, the other small species with straight bills. In this action of Brisson's we see the origin of the curious fashion which so long endured among French writers, that of distinguishing "Colibris" from "Oiseaux-mouches" among *Trochilidae*. It is also notable as the starting-point of a generic subdivision of the group which was destined at length to reach the farcical and scandalous extreme of some 350 genera for few more than 400 known species.

In 1779, Buffon adopted the same two divisions of "Colibris" and "Oiseaux-mouches," presenting 19 species of the former and 24 of the latter group, a total of 43 *Trochilidae*. If we except the mere naming and describing of some additional species by Gmelin and Latham, nearly all that had been learned of the birds up to the close of the last century was reflected in the works of these two famous French authors.

In 1788, the industrious but indiscriminate and incompetent compiler of the Thirteenth edition of the *Syst. Nat.* produced a total of 65 species of *Trochilus*. None were described except at second-hand, but to many of them binomial names were first affixed. Two years afterward 65 species of *Trochilus* were recorded in the *Ind. Orn.* of Latham.*

We are thus brought, by the stepping-stones of but few works requiring special mention here, to the opening of the nineteenth century, which saw Audebert and Vieillot's luxurious work, *Ois. Dorés*, perhaps the first ornithological work which

ily this has been with writers. An "Addendum to the *Trochilidae* (pp. 690-692), which embodies a systematic review of *Trochilidinae* literature, and an "Index Generum *Trochilidarum*" (pp. 692-696), consisting of an alphabetical list, with references, of no less than four hundred and six different generic names (including sometimes two or more different spellings of the same name), render this bibliography very complete up to date, and quite indispensable to any one doing special work upon this group of birds.

* The eighth volume, 1812, of Shaw's *Gen. Zool.* gave 70 species of *Trochilus*.

undertook to reproduce metallic reflections of plumage. The feathery Iris of these exquisite creatures is always fascinating, and there are no more favorable subjects for glittering plates. The work, indeed, was not exclusively a monograph of the Hummers, but the *Histoire Naturelle des Colibris et des Oiseaux-mouches* formed a large part of the undertaking. Scientific names were not used in the *Ois. Dor.*, but a technical nomenclature of the subjects of the work was furnished by Vieillot in 1817.

The first great illustrated work on Hummers exclusively was Lesson's, published in parts, from 1829 to 1832, the parts being afterward grouped in three separately titled volumes. This author described and figured in colors upward of 100 (about 110) species, many of which were actually new, and to many more of which new names were given. A very few genera, additional to or in place of Brisson's, had meanwhile been proposed; but Lesson was the first to introduce any considerable number of new generic names. Many of those, however, which Gray and others have since cited as generic, were certainly not used or intended as such by Lesson, being simply vernacular designations of certain "tribes" and "races" among which he distributed the *Trochilidae*, such words as "Bleuets" and "Queues étroites," for example. French authors were (and I think many of them still are) such sinners in spelling that it is not always easy to say what words of theirs they would have us take as technical. Possessing a copious and voluble vocabulary, largely supplemented by gesture-speech or shrug-language, and violating in their articulation the usual powers of written characters, they not only acquired a trick of gallicizing technical words, but they also cultivated a characteristic habit of rising superior to orthography. If Vieillot could write *Cripsirina* for *Cryptorhina* without flinching, we need not wonder that Lesson invented *Ornismya*, which he defended as against *Ornithomyia*, or that some of his successors reached the height of *Ornysmia*!

The Hummers have always been objects of study peculiarly agreeable to French ornithologists. Their daintiness, so to speak, seems to suit the national genius. French literature, therefore, figures in the written history of these birds to an extent greater than that observable in any other family of birds. About the time we have reached, however, several English names became prominent in the present connection, as those of Swainson, Vigors, Loddiges, and especially Jardine, for Gould had not then begun the work which was afterward to identify his name with *Trochilidina* literature. Swainson had already classified the Hummers as a part of his general scheme, describing some new species and establishing certain genera. In 1833, and thus upon the heels of Lesson's memoirs, Sir William Jardine prepared his monography, to the valuable and agreeable text of which Lizars contributed beautiful illustrations. The home of the Hummers was heard from the same year in La Llave's *Memoria*, and Schreibers's *Collectanea* of same date consisted only of these birds. From this time until the beginning of Gould's great work in 1849 appeared no monographic treatise on *Trochilidae*. But the period was one of great activity, among both English and French writers; the accumulation of material was rapid and incessant, and many papers of these years described new genera and species, though too often hastily and inadequately. In England, Gould and Fraser were busy with their materials. In France, the writings of Lesson continued; Bourcier became prominent in the number of his papers; while Boissoneau, De Lattre, Gervais, Longuemare, and others made their respective contributions. This was the period of accumulation rather than of elaboration; numberless new names were introduced, but among them were many synonyms, both generic and specific, little or no systematic revision of the subject being effected, unless Gould's *Draft Arrangement*, the precursor of his *Monograph*, be considered of such character.

The thirteen years, 1849-1861, during which Gould's work was pending, marked the next period in the history of the subject. The preparation of this great work held its author, already recognized as the leading *Trochilidist*, to his subject; and the appearance of successive parts served as a continual stimulus to others to move in

the same direction. The author published many papers describing cursorily new objects about to be depicted in his magnificent folios, and several French ornithologists, notably Bourcier and Mulsant, were little behind him in this respect. The period was also marked by the appearance in England of Martin's *General History*, in some sense a continuation of Jardine's work. It was furthermore characterized by the malignant epidemic which we may call the genus-itch, which broke out simultaneously in 1849, from two foci of contagion, in France and in Germany, and proved disastrous in the extreme. The infection reappeared in an aggravated form in 1854, and Trochilidine literature has never entirely recovered from its effect.

Many genera of Hummers, notably Swainson's, Lesson's, and Gould's, had been found acceptable and, indeed, necessary; but the most embarrassing results attended the steps of some authors who coined names on the glancing of a feather in this beautiful group of birds. As just stated, serious difficulty began in 1849, in those parts of Bonaparte's *Conspectus* and of Reichenbach's *Systema* which treat of *Trochilidae*; and in 1854 each of these authors increased it immeasurably, the one in his *Tableau*, the other in his *Aufzählung*. But I have on previous pages sufficiently commented upon this matter.

The completion of Gould's splendid monument closed this period of accumulation. The subject had grown rapidly and had become unmanageable. Some authors had simply amused themselves in "playing chess" with the names of Hummers, and many had pressed forward with new species upon insufficient examination of known material or inadequate regard for what others had published. The fog of synonymy had completely enveloped the subject. It was hazardous to enter it, and it seemed almost hopeless to attempt to lift it. The *Monograph* represented, therefore, rather a broad and secure basis for future investigation than any final accomplishment. It gave a series of 360 colored plates of about as many species, real or nominal, with accompanying descriptive letter-press, other species added in the *Introduction* raising the total to 416, referred to 123 genera. But many new names, generic and specific, were still to see the light; many others were to sink into synonymy; the nomenclature was still shifting; in short, studious and judicious systematic revision of the whole subject was imperatively demanded. If Gould's work made this necessity apparent, it also immeasurably contributed to the desired result.

Previous to this Gouldian period American writers did next to nothing for the special literature of the family; but during this time and subsequently many new species were described by Lawrence. In 1860, and therefore just before the period closed, Germany brought a fascicle of the *Museum Heineanum* to bear upon the subject, many new genera and some new species being described by Cabanis and Heine. In 1863 the *Trochilidica* of the last-named author appeared in the *J. f. O.*, with a similar result. In 1866 MM. Mulsant and Verreaux's *Essai d'une Classification Méthodique* appeared as the precursor of a more elaborate work then contemplated, containing fresh accessions to the number of genera with which the family was destined to be burdened and a rearrangement of the whole group. This decade, 1861-1870, saw also a fair number of minor papers, calling, however, for no special remark here. It represented flood-tide in the mere describing of species, and their rearrangement in futile genera; the ebb necessarily followed.

The state of the case at that moment was faithfully reflected in Gray's Handlist. This catalogued 469 species, real or nominal, distributed in 163 genera or subgenera and carrying a load of synonymy amounting in the aggregate to perhaps 800 specific and 300 generic names. This, it will be remembered, is irrespective of the endless combinations of generic and specific names which, were they counted, might represent a total of several thousand binomial names which have been imposed upon a family of birds consisting of few more than 400 known species, conveniently referable to about one-fourth as many modern genera!

Such a state of things as this inevitably tended toward a healthy reaction; and during the last decade the accessions of new names have been fairly offset by the re-

duction of others to synonyms. It is true that the *Histoire Naturelle des Oiseaux-mouches* of MM. Mulsant and Verreaux and M. Mulsant's *Catalogue*—these being among the most notable publications of this period—can scarcely be regarded as tending in this direction, viewing the many additional new names which they present. Having seen neither of these treatises, I can not judge of their claims to be considered as advancing or improving the science. But it can not be doubted that the patient and faithful study which Messrs. D. G. Elliot and O. Salvin have of late applied to the amelioration of Trochilidina affairs has done much toward the needed reform. These skillful ornithologists have published numerous papers reviewing different groups of Hummers, under the most advantageous circumstances as regards handling material and examining literature, and their criticisms have been of the greatest service, not only in defining genera and species, but in sifting synonymy and settling nomenclature. Mr. Elliot's labors have borne their final fruit in his *Classification and Synopsis of the Trochilidae*. However qualified a success the experts may conclude this performance to be, it is certainly a great boon to the working ornithologist, and a faithful reflection of the present state of our knowledge respecting the exquisite creatures to the elucidation of whose history it is devoted.

NAMES AND THEIR ORIGIN.

The origin and meaning of the term "Humming Bird" and of other names by which these birds are known in various languages are very tersely explained by Mr. Gould in his magnificent Monograph of the Trochilidæ, as follows:

The questions have often been asked, Whence is the term Humming Bird derived? and Why is the bird so called?

I may state in reply that owing to the rapid movement of the wings of most of the members of this group, but especially of the smaller species, a vibratory or humming sound is produced while the bird is in the air, which may be heard at the distance of several yards, and that it is from this circumstance that the trivial name by which these birds are known in England has arisen. In France they are recognized by the terms *Oiseau-Mouche* [fly-bird] and *Colibri*; in Germany their common appellation is *Kolibri*; by the Dutch they are called *Kolibrielje*; by the Spaniards, *Picaflores* [flower peckers] and *Tomino*; by the Portuguese, *Tomeneço* and *Beija flor*; in the neighborhood of Xalapa they are known by the names of *Chupa-rosa* and *Chupa-myrra*, Rose-sucker and Myrtle-sucker; by the Creoles of the Antilles and Guiana they are known by the names of *Murmures* [murmurers], *Bourdons*, and *Frou-frous*. From the Mexicans, Peruvians, and other nations of South America they have received various appellations, such as *Ouissa*, *Huitzitzil*, *Tzitzitolotl*, *Guanumbia*, *Quinti* or *Quintiut*, *Quindé*, *Visiclin*, *Pigada*, and *Courbiri*, all terms of a metaphorical character, signifying "rays of the sun," "tresses of the day-star," "murmuring birds," etc.

In addition to the foregoing, Marcgrave mentions *Guainumbi* or *Guinambi*, *Aratica*, and *Aratarataguaca* as names by which they were known among the Brazilian Indians of his day. The English name, Humming Bird, is sometimes shortened into Hummer, but this term is not so satisfactory as the other, notwithstanding the advantage of brevity.

GEOGRAPHICAL DISTRIBUTION.

The Humming Birds, more than any other family, constitute the most remarkable feature of the New World bird-life. They have absolutely no representatives in any other part of the world, the Swifts being

the nearest relatives they have in other countries. When, in the classification of birds, superficial or general resemblance was more considered than structural affinity, the Humming Birds were supposed to have representatives in the tropical regions of the eastern hemisphere in the Sun Birds (*Nectariniidae*); but the latter belong to a different order, *Passeres*, and are not very unlike, in their general structure, the American family of Honey Creepers (*Corebidae*), of which they may be considered the more brilliantly colored Old World analogues.

Of all the many families of birds which are entirely peculiar to the rich bird-fauna of America, the Humming Birds probably constitute the most numerous assemblage, about 500 distinct kinds being now known, while others are being brought to light with almost every fresh collection made in Mexico, Central America, or the higher lands of South America.

They abound most in mountainous countries, where the configuration of the surface and productions of the soil are most diversified within small areas. Their center of abundance is among the northern Andes, between the parallels of 10 degrees north and south of the equator, from which region they gradually diminish in numbers both to the northward and southward, but much more rapidly toward the extensive lowlands of the eastern portion of the continent. The northern limit of their abundance may be approximately given as the Tropic of Cancer, beyond which but few of the fifty Mexican species extend, while only eighteen of them have been detected across the boundary line in the equally mountainous portions of the southwestern United States, including the semitropical Rio Grande Valley. Small as this number may appear, the southwestern portion of the Union may be considered richly endowed compared with the vast valley of the Mississippi and the Atlantic water-shed, a region of unsurpassed fertility and luxuriant vegetation, yet which throughout its whole extent, even including the peninsula of Florida, possesses only a single species of Humming Bird! In this scarcity, compared with the western mountainous regions, of representatives of a numerous family of birds, we see a certain parallelism with the lowlands of eastern South America as compared with the Andean highlands, only, on account of climatic differences, the contrast is by far more marked. A peculiar group of Humming Birds, the Hermit Hummers (genera *Phaethornis*, *Glaucis*, *Androdon*, and *Rhamphodon*), is more numerous in Brazil than elsewhere. These are all very plainly colored birds, with little metallic coloring, sometimes none, and instead of living in the sunshine and feeding among flowers they inhabit the gloomy forests and subsist wholly on insects gleaned from the branches and leaves of trees. Apart from these, however, Humming Birds are poorly represented in Brazil, compared with the Andean highlands. Mr. Gould comments on this as follows :

Other beautiful kinds do here and there exist in Brazil, such as the *Chrysolampis moschitus* [Ruby and Topaz], the *Topaza pella* [Topaz-throat], and the *Lophornithes* [Coquette Humming Birds]; but the greater number are comparatively small and

inconspicuous. Of the members of the genus *Phaethornis*, a group of Humming Birds popularly known by the name of Hermits, from their frequenting the darkest and most retired parts of the forest, three-fourths are natives of Brazil. The great forest-covered delta of the Amazon, where palms are numerous, seems to be particularly unfavorable to the Trochilidae, since from Pará to Ega there are scarcely ten species of the family to be met with.

Taking the different countries of America, without strict reference to either political or geographical boundaries, they stand in relation to the number of species of Humming Birds which they possess about as follows: First, Ecuador, with considerably more than 100, closely followed by Colombia, with about 100 species; next, Peru and Bolivia together, with about 96; third, Central America (from Veragua to Guatemala, inclusive), with about 70; fourth, Brazil, with a little over 60, though many of these belong to the region of the Amazon basin, and therefore are not properly Brazilian; fifth, Venezuela (including the islands of Trinidad and Tobago), with between 50 and 60 species; sixth, Mexico, with about 50; seventh, Guiana, with about 30; eighth the West Indies, with less than 20; ninth, the United States, with 17, of which all but 8 barely come across the boundary from Mexico, and therefore should hardly be counted; tenth, the southern extremity of South America (including Chili and the greater part of the Argentine Republic), where only about 7 occur, and 2 of these merely as intruders from the warmer regions to the northward. In North America no Humming Bird is known to occur beyond the parallel of 61 degrees, the Rufous Humming Bird (*Selasphorus rufus*) reaching that latitude on the Pacific coast, while on the eastern side the Ruby-throat (*Trochilus colubris*) has been traced to 57 degrees north latitude.

The geographical distribution of Humming Birds is a matter of great interest, some of them being of widely extended range, while others are confined to single mountain peaks or valleys. But owing to the careless manner in which many authors state the range of species, it is at present impossible to express with more than approximate correctness the comparative richness of different countries or faunal provinces in their representation of these birds. Even some of our standard authorities are content to say "Brazil," "Central America," or "Mexico" when giving the habitat of a species, apparently ignorant of the fact, or at least quite ignoring it, that it makes all the difference in the world what particular part of those extensive countries the species in question may inhabit. Thus, the political boundaries of Brazil include not only the Brazilian faunal province, but a considerable portion of the Amazonian province, each with several more or less distinct subdivisions, while Central America includes two quite distinct subprovinces, composed of the republics of Costa Rica and Nicaragua on the one hand, and the greater part of Guatemala, Salvador, and Honduras on the other, though just where the two subprovinces merge together we do not yet know. That political areas do not by any means correspond with faunal areas is an important fact which should be constantly

borne in mind by the collector as well as by the compiler; for, until our knowledge of the range of each species within a given country is far more complete than it is at the present time, we cannot sketch the geographical distribution of these birds, as a group, with any degree of accuracy. In order to fully appreciate this difficulty, it is only necessary for one to understand that when the range of a species is said to be "Brazil" (as in even the best of books on the subject), no one can tell whether it belongs to the true Brazilian or the Amazonian province, since both are chiefly included within the area of the country known politically as Brazil, though zoologically they are far more distant from one another than is North America from Europe or the latter from temperate Asia! The true Brazilian Province, moreover, includes, besides a large portion of Brazil itself, the politically distinct countries of Paraguay and Uruguay, together with adjoining portions of the Argentine Republic and Bolivia.

Authorities on the subject of geographical distribution of animals differ as to the relative value or importance of these faunal divisions; but there is little difference of opinion as to their number and approximate boundaries. Beginning at the south and proceeding, irregularly, northward, they are as follows:

I. The Patagonian or Chilian Province, embracing Tierra del Fuego, Falkland Islands, Chili, Patagonia, the greater part of the Argentine Republic, and the southeast portion of Bolivia.

II. The South-Brazilian Province, comprising all of Brazil south of the Amazon basin, the whole of Uruguay and Paraguay, and the northeast portion of the Argentine Republic.

III. The Amazonian Province, including, besides the entire Amazon basin (below a certain altitude upon the head streams), all of Guiana, that portion of Venezuela south of the Orinoco, the Amazon watershed of Bolivia, the northeast corner of Peru, and the eastern part of Ecuador and Colombia.

IV. The Colombian Province, comprising the central and littoral districts of Colombia, Venezuela north of the Orinoco (including the Islands of Trinidad and Tobago), central and western Ecuador, the whole of Peru except the northeast corner and the higher Andean summits, and a part of western and southwestern Bolivia.

V. The Central American Province, embracing that portion of the continent from the Isthmus of Panama northward to southern Mexico, where the so-called Neotropical Region merges into the so-called Neartic Region.

VI. The West Indian Province, which embraces the whole of the Antillean archipelago, from the Bahamas southwards, but *not* including either Tobago or Trinidad.

For the present purpose, however, it will be more practicable to combine III and IV into one "province," which for convenience may be termed the Colombo-Amazonian, and extend its limits to the northward

to include the entire isthmus as far as the coast region of Mexico, thus restricting the Mexican Province to the plateau region and higher lands for an undetermined distance southward, probably not farther than the highlands of Guatemala, Honduras, and northern Nicaragua, but possibly including the higher summits of Costa Rica, where a considerable number of northern types occur.*

Of all these "provinces" the composite one, which I have termed the Colombo-Amazonian, is incomparably the richest in bird life of any region of the earth; and it is therefore not strange that nearly one-half of all the known species of Humming Birds should be peculiar to its territory. The next in comparative richness in birds of this family is probably the Mexican, in its comprehensive sense, for owing to the carelessness of authors in designating localities it is at present impracticable to separate the species which properly belong to this province from those belonging to the northern extension of the preceding one. Of the 93 species and 23 genera peculiar to the country north of the Isthmus of Panama, about 55 species and 14 genera do not occur south of Guatemala or Honduras. The Brazilian Province probably comes next in number of peculiar species, but it is at present impossible to tell just how many should be credited to it, a very considerable proportion of the 38 species whose range is given as "Brazil" undoubtedly belonging to Colombo-Amazonian Province. From the comparatively small number of Humming Birds peculiar to the Brazilian Province there is a decided falling off in those of the West Indian Province, where we are able to count only 18 peculiar species; but this number seems large compared with the showing made by the two most widely separated and coldest provinces, the North American and the Chilean, which have only 8 and 5 species, respectively, of Humming Birds peculiar to them.

The grand centre or focus of the family of Humming Birds is that portion of the Colombo-Amazonian Province comprised within the limits of the State of Ecuador, where considerably more than 100 species occur (more than one-fifth of all that are known), more than half of them occurring nowhere else. Colombia is nearly as rich, having about 100 species, nearly 50 of which are peculiar. Peru and Bolivia together (included within the southwestern portion of the same province) possess about 90 species, of which more than half are peculiar. Northward and northeastward from the "focal center" the number of species diminishes gradually, Central America (including Guatemala) having about 70 species (40 peculiar), Mexico, alone, about 50 (28 peculiar), Venezuela, (including Trinidad and Tobago) between 50 and 60 (15 peculiar), Guiana about 36 (12 peculiar), and the West Indies with only 18 (*all of them peculiar*).

* For example, among Humming Birds four species of the genus *Selasphorus* and one each of *Eugenes*, *Doricha*, *Eupherusa*, and *Caligena*, and others related to or identical with more northern forms. It is true a much larger number of southern types occur in the same country, but they are mainly restricted to lower and therefore more tropical elevations.

On the other hand, the decrease to the southeastward from the "focal center" in the true Brazilian Province is very great; it is impossible, at present, to properly estimate the total number of species found there, but it is probably considerably less than 50, with, however, perhaps more than half of them peculiar.

MIGRATIONS.

While in tropical regions the Humming Birds are, like other kinds, permanent residents, or at most make comparatively slight migrations when the food supply of a given locality fails them, or when, on high mountains, the increasing cold forces them to descend to the warmer slopes and valleys, those of temperate regions make extensive and regular migrations like other birds of the same regions, coming from the south in spring and returning in autumn. Thus, the common Ruby-throated Humming Bird (*Trochilus colubris*) has its summer home in eastern North America, where it occupies the extensive region stretching from the Gulf of Mexico to half way across the British Provinces (at least to latitude 57 degrees north), and from the Atlantic coast to beyond the Mississippi. It breeds throughout this area, but is not known to do so south of the United States. In winter, however, its range is shifted far to the southward, the northern recorded limit at that season being southern Florida (Punta Rassa, latitude about 29 degrees), and the southern limit in Veragua, the western portion of the Isthmus of Panama, only about 8 degrees north of the equator. It is thus evident that, notwithstanding their diminutive size, some individuals of this species perform an annual migration of at least 28 degrees of latitude, equivalent to nearly 2,000 statute miles! On the opposite side of the continent the highest latitude attained is about that of 61 degrees, on the coast of Alaska, where the Rufous-backed Humming Bird was found by Kotzebue. The same species winters in Mexico, so that in their migrations those individuals which pass the summer farthest north traverse considerably more than 2,000 miles of territory! It is only in the warm valleys of California and in southern Florida that any species of Humming Bird regularly passes the winter within the borders of the United States; in the former the Anna Humming Bird (*Calypte anna*), and in the latter the Ruby-throat (*Trochilus colubris*). All the species of western North America (including many individuals of *C. anna*) winter in Mexico, only one of the truly northern species (*Selasphorus platycercus*) extending its winter range as far as Guatemala.

The vertical range of some species in mountain districts is quite remarkable. In July, 1868, the writer observed examples of *Selasphorus platycercus* in the dooryard of a ranch in Ruby Valley, Nevada, the altitude being between 6,000 and 7,000 feet, and later during the same day saw a single individual of the same species at the extreme summit of the immediately adjacent East Humboldt Mountains, nearly 6,000 feet higher.

HABITS.

The general habits of Humming Birds are in most respects similar to those of other birds. They are both arboreal and aerial, but are unable to progress upon the ground, or any flat surface, by means of their legs and feet alone. They perch frequently upon trees or bushes, or even in rare instances cling to rocks; and their mode of nidification presents nothing that may be deemed peculiar or even specially characteristic. In their flight and manner of procuring their food, however, they differ strikingly from other birds, in these respects much more closely resembling certain insects than any of the "feathered tribe."

Says Prof. Alfred Newton :

Wilson, Audubon, Mr. Gosse, and several others, gifted with the "pen of a ready writer," have so fully described, as far as words will admit, the habits of different members of the family *Trochilide* that it is unnecessary to say much upon this score. Their appearance is so entirely unlike that of any other birds that it is hopeless to attempt in any way to bring a just conception of it to the ideas of those who have not crossed the Atlantic; and even the comparison so often made between them and the *Sphingida*, though doubtless in the main true, is much to the advantage of the latter. One is admiring the clustering stars of a scarlet *Cordia*, the snowy cornucopias of a *Portlandia*, or some other brilliant and beautiful flower, when between the blossom and one's eye suddenly appears a small dark object, suspended, as it were, between four short black threads meeting each other in a cross. For an instant it shows in front of the flower; an instant more it steadies itself, and one perceives the space between each pair of threads occupied by a gray film; again, another instant, and, emitting a momentary flash of emerald and sapphire light, it is vanishing, lessening in the distance as it shoots away to a speck that the eye can not take note of, and all this so rapidly that the word on one's lips is still unspoken, scarcely the thought in one's mind changed. It was a bold man or an ignorant one who first ventured to depict Humming Birds flying; but it can not be denied that representations of them in that attitude are often of special use to the ornithologist. The peculiar action of one, and probably of many or all other species of the family, is such that at times, in flying, it makes the wings almost meet, both in front and behind, at each vibration. Thus, when a bird chances to enter a room it will generally go buzzing along the cornice; standing beneath where it is, one will find that the axis of the body is vertical, and each wing is describing a nearly perfect semicircle. As might be expected, the pectoral muscles are very large; indeed, the sternum of this bird is a good deal bigger than that of the common Chimney-Swallow (*Hirundo rustica*, L.) But the extraordinary rapidity with which the vibrations are effected seems to be chiefly caused by these powerful muscles acting on the very short wing-bones, which are not half the length of the same parts in the Swallow; and accordingly, great as this alar action is, and in spite of the contrary opinion entertained by Mr. Gosse (*Nat. Sojourn in Jamaica*, p. 240), it is yet sometimes wanting in power, owing doubtless to the disadvantageous leverage thus obtained; and the old authors must be credited who speak of cobwebs catching Humming Birds.

Among the multitude of forms which compose this extensive family of birds there must necessarily be some which depart, more or less, in certain particulars as regards their habits, from the more typical kinds; but so far as their habits have been recorded, I have been able to find only one example of unusual or extraordinary peculiarity in this respect, namely, the curious habit of the Pichincha Hill-star (*Oreotrochilus*

pichincha) of clinging to the vertical or overhanging surface of bare rocks, thus described by Mr. L. Fraser:*

I observed three specimens of this bird, all of a row, hanging to the bare rock (this now explains the use of those large feet and claws which the species of this group have, and which has hitherto puzzled me) like Sand-martins; it was under a ledge, well protected from the weather, consequently well adapted by nature for nest-building. (They would fly away and then return; this was done in my sight three or four times in succession.) On examining the spot, which was almost inaccessible, I found much excrement, proving to my mind that they breed in societies. My countryman, Colonel Stacey, on a visit to this mountain, happened to have on a new bright yellow oil-skin cover to his wide-awake hat, and one of these birds flew round and round it for a considerable time, as he supposes, mistaking it for a flower.

ABUNDANCE OF INDIVIDUALS.

In regions where several species occur, Humming Birds are often as numerous as bees about the flowers; but in the eastern portion of North America, where, even in Florida, only one kind is found, they are seldom seen in any considerable numbers, though during the period of flowering of some bush or tree the blossoms of which they are specially fond of (as for example the Black Locust, *Robinia pseudacacia*), one may, under the most favorable circumstances, see scores of them in different parts of the same tree. In the more southern portion of the western United States, however, where several species often occur together, they are far more numerous, on occasions fairly swarming in their favorite localities. Referring to Humming Birds observed at one of his camps in the mountains of New Mexico, near the headwaters of the Pecos River, Mr. Henshaw writes as follows:†

The number of representatives of this [the Rufous Hummer, *Selasphorus rufus*] and the preceding species [the Broad-tailed Hummer, *S. platycercus*] that make their summer homes in these mountains is simply beyond calculation. No one whose experience is limited to the eastern United States can form any adequate idea of their abundance. They occur from an altitude of about 7,500 feet far up on the mountain sides, as high up, in fact, as suitable flowers afford them the means of subsistence. They are most numerous at an altitude of from 8,000 to 9,000 feet. During the entire summer they frequent almost exclusively a species of *Scrophularia* which grows in clumps in the sunnier spots of the valleys. From early dawn till dusk the Humming Birds throng around these plants intent in surfeiting themselves on honey and the minute insects that the honey attracts. The scene presented in one of these flowering areas is a most attractive one. * * *

Some idea of the number of Humming Birds in this locality—and in this respect this whole mountain area is alike—may be gained from the statement that in a single clump of the *Scrophularia* I have counted eighteen Hummers, all within reach of an ordinary fishing rod. There was scarcely a moment in the day when upwards of fifty could not be counted within the area of a few yards in any of the patches of this common plant.

At Apache, Arizona, in the month of August, Mr. Henshaw found the same species, “literally by hundreds, hovering over the beds of brightly-tinted flowers, which in the mountains especially grow in the greatest

* In Proceedings of the Zoological Society of London, 1860, p. 80.

† The Auk, vol. III, 1886, pp. 76-78.

profusion on the borders of the mountain streams."* In the Catalina Mountains of Arizona, in August and September, Mr. W. E. D. Scott found it "very abundant, feeding on thistles and a kind of scarlet flower very similar to the *Salvia* or Scarlet Sage," it being "no uncommon sight to see from twenty to fifty of the birds at once;" and in the valley of the Truckee River, near Pyramid Lake, Nevada, I found them equally numerous among the sunflowers which grew in patches in the river bottoms.

In the tropical regions, where, instead of one or at most three or four species, dozens of kinds inhabit the same district the abundance of individuals is frequently amazing to one unused to such sights.

Says Mr. Waterton :

Cayenne and Demerara produce the same Humming Birds. Perhaps you would wish to know something of their haunts. Chiefly in the months of July and August the tree called Bois Immortel, very common in Demerara, bears abundance of blossoms which stay on the tree for some weeks; then it is that most of the species of Humming Birds are very plentiful. The wild Red Sage (*Salvia splendens*) is also their favorite shrub; and they buzz like bees round the blossoms of the Wallaba tree; indeed, there is scarcely a flower in the interior or on the seacoast but what receives frequent visits from one or other of the species.

On entering the forests of the rising land in the interior, the blue and green, the smallest brown, no bigger than the humblebee, with two long feathers in the tail, and the little forked-tail purple-throated Humming Birds glitter before you in ever-changing attitudes.

As you advance towards the mountains of Demerara other species of Humming Birds present themselves before you.

The Humming Birds of Jamaica are not as numerous in species as those of California (there are only three species), but they appear to make up for this deficiency by abundance of individuals.

I can not quit the subject [says the Rev. Lansdown Guilding] without speaking of the delight that was afforded me in Jamaica by seeing Humming Birds feeding on honey in the florets of the great Aloe (*Agave americana*, Linn.). On the side of a hill upon Sutton's estate (the property of Henry Dawkins, esq.) were a considerable number of aloe plants, of which about a dozen were in full blossom. They were spread over a space of about 20 yards square. The spikes, bearing bunches of flowers in a thyrsus, were from 12 to 15 feet high; on each spike were many hundred flowers of a bright yellow color, each floret of a tubular shape and containing a good-sized drop of honey. Such an assemblage of floral splendor was in itself most magnificent and striking; but it may be imagined how much the interest caused by this beautiful exhibition was increased by vast numbers of Humming Birds, of various species, fluttering at the opening of the flowers, and dipping their bills first into one floret and then into another, the sun, as usual, shining bright upon their varied and beautiful plumage. The long-tailed or Bird-of-Paradise Humming Bird was particularly striking, its long feathers waving as it darted from one flower to another. I was so much delighted with this sight that I visited the spot again in the afternoon, after a very long and fatiguing day's ride, accompanied by my wife, on horseback, when we enjoyed the scene before us for more than half an hour.

* Report of Ornithological Collections, Wheeler's Expedition, p. 131.

ACTIONS AND ATTITUDES.

Humming Birds are so distinct from other birds in their external structure and manner of flight that they present in every respect, except when at rest, an appearance entirely peculiar to themselves. They spend perhaps the greater part of their time upon the wing, usually hovering or balancing themselves before a flower from which they are procuring their sustenance of honey or minute insects. At such time the body is nearly vertical or inclined at a slight angle, the head bent nearly at right angles with the axis of the body, the wings spread nearly at right angles with the same axis, but vibrated so rapidly that they are visible only as an indistinct haze on each side of the body of the bird. While in this position the tail is spread, and with it the bird largely regulates its distance from the flower by flirting the tail forward, or the reverse, when it wishes to recede or advance, respectively.

While resting they usually select a slender dead twig, in a prominent or exposed portion of a bush or tree, where they sit in a nearly vertical position, with head drawn down and feathers of the throat puffed outward, something in the manner of swallows. The wings usually if not invariably drop *beneath* the generally unspread tail. They are fond of preening their plumage, and thus afford a variety of graceful attitudes for showing off particular parts of the plumage to advantage. Mr. Audubon observes that they are particularly fond of spreading one wing at a time and passing each of the quill feathers through their bill in its whole length, when, if the sun is shining, the wing thus plumed is rendered extremely transparent and light. Mr. Audubon also observes that when perching "they move sidewise in prettily measured steps, frequently opening and closing their wings, pluming, stroking, and arranging the whole of their apparel with neatness and activity."

Comparatively few persons have had the opportunity to observe the actions of the female Humming Bird when setting on her nest or when maneuvering in its immediate vicinity. The following account of the actions of a female Ruby-throat (*Trochilus colubris*) will therefore probably be of special interest :

Although I spent several hours watching this nest, on different occasions, no food was brought at such times, but the actions of the female, as seen through a strong field glass at short range, were decidedly interesting. The approach to the nest was as usually described in about one-third of the records—i. e., directly to a point over and close to the nest, then dropping lightly into it. The general method, however, was by a dashing flight to within 12 or 15 feet, a sudden pause while poised in the air, anxiously looking about her, then 1 or 2 feet further, another pause with the same maneuvers, to be repeated until at last she dropped into the nest as ordinarily. This entire procedure occupied less than 10 seconds. A few times she seemed to fly directly into the nest without any preliminaries.

Just after settling in the nest she had a habit of occasionally completely turning around in it one or more times. This was a hitching motion, as if by the use of her feet, meanwhile appearing to rearrange the material on the outside and as if shaping the interior to her better satisfaction by this treading motion. At other times, spread-

ing her wings over the nest in a seeming ecstasy of delight, she rather flutteringly turned around in it, apparently without regard for its precious contents.

There seemed to be one never varying position when at rest, that facing the more open part of the grove, the usual direction of approach being from behind, whereas the flight from the nest was toward the clearer space in front. The sitting posture was not one of absolute rest at any time, as the head was constantly in motion, so that no approach could be made without her knowledge. The flight from the nest seemed to be directly out of it, without any preliminaries. The weather was warm, yet she would remain on the nest from 15 to 20 minutes, and in no instance was away more than 2 minutes while I had her under observation. The male frequently appeared in the vicinity, but neither offered food nor even deigned to alight on the same tree, yet birds which had a good claim in the neighborhood dared not approach very close, as the combined attack of these active birds always proved so distasteful that they invariably beat a hasty retreat.*

MANNER OF FLIGHT.

The extraordinary development of the pectoral muscles in the Humming Birds and its purpose is made a special topic on pages 292, 293; but a preliminary description of the motion imparted to the wings by these powerful engines, if such they may be styled, and other particulars relating to the flight of Humming Birds, may be given here. As birds differ from all other animals in the possession of feathers, so do Humming Birds differ from all other birds in their manner of flight, which, as Mr. Gosse truly says, is entirely that of an insect, especially a large beetle or a bee. "To me," says Mr. Gould, "their actions appeared unlike anything of the kind I had ever seen before, and strongly reminded me of a piece of machinery acted upon by a powerful spring. I was particularly struck by this peculiarity in the flight, as it was exactly the opposite of what I expected. The bird does not usually glide through the air with the quick, darting flight of a Swallow or Swift, but continues tremulously moving its wings while passing from flower to flower, or when taking a more distant flight over a high tree or across a river. When poised before any object this action is so rapidly performed that it is impossible for the eye to follow each stroke, and a hazy semicircle of indistinctness on each side of the bird is all that is perceptible.†

The wind produced by this rapid vibration of the wings is very considerable, Mr. Salvin having noticed that while a Humming Bird which had flown into a room was hovering over a large piece of wool, the entire surface of the wool was violently agitated.

Probably no one has ever observed the actions of Humming Birds with greater care than Mr. Gould, whose enthusiastic interest in them

* Edwin H. Eames, in "The Auk," July, 1890, pp. 287, 288.

† According to Mr. Gosse ("Birds of Jamaica," p. 133), the vibration of each wing in the *Mellisuga minima* reaches nearly or quite 180 degrees. In several of the plates of the present work the artists have attempted to depict the appearance of the wings during flight—the birds being represented in the attitude of poising over the nest. (See plates XLI and XLII. The appearance of the extended wings in plates XLIII and XLIV is, of course, incorrect, the object being to show the form of the wing and arrangement of its feathers.)

must naturally have reached its culminating point when he first beheld living specimens in the full freedom of their native haunts. He thus tersely describes their flight:

Although many short intermissions of rest are taken during the day, the bird may be said to live in air—an element in which it performs every kind of evolution with the utmost ease, frequently rising perpendicularly, flying backward, pirouetting or dancing off, as it were.

Regarding the ability of the Humming Bird to fly backward, we quote the following, by Bradford Torrey, from *Science*, vol. II, No. 34, p. 436:

The Duke of Argyle, in his *Reign of Law* (p. 145), lays it down in italics, that "*no bird can ever fly backwards.*" He mentions the Humming Bird as appearing to do so, but maintains that in reality it falls rather than flies, when, for instance, he comes out of a tubular flower. But this morning while watching the motions of a Humming Bird (*Trochilus colubris*), it occurred to me to test the *dictum* of the duke, and unless my eyes were altogether at fault, the bird did actually fly backwards. He was probing, one after another, the blossoms of a petunia bed, and more than once, when the flower happened to be low down, he plainly rose rather than fell as he backed away from it.

The present writer has observed the same thing, but has noticed that the backward motion is greatly assisted by a forward flit of the expanded tail as the bird shifts from place to place, or from one part of a tree to another, sometimes descending, at others ascending. It often towers up above the trees, and then shoots off like a little meteor at a right angle; at other times it quietly buzzes away among the flowers near the ground; at one moment it is poised over a diminutive weed, at the next it is seen at a distance of 40 yards, whither it has vanished with the quickness of thought. During the heat of the day the shady retreats beneath the trees are very frequently visited; in the morning and evening the sunny banks, the verandas, and other exposed situations are more frequently resorted to.

"All the Humming Birds," says Mr. Gosse, "have more or less the habit when in flight of pausing in the air, and throwing the body and tail into rapid and odd contortions; this seems to be mostly the case with the Mango (*Lampornis mango*), but perhaps is more observable in *Polytmus* from the effect that such motions have on the beautiful long feathers of the tail. That the object of these quick turns is the capture of insects I am sure, having watched one thus engaged pretty close to me. I drew up and observed it carefully and distinctly saw the minute flies in the air, which it pursued and caught, and heard repeatedly the snapping of the beak. My presence scarcely disturbed it, if at all."

That there are exceptions to the manner of flight which we have described, is true, but they probably are not numerous. One of the most notable is that of the Giant Humming Bird (*Patagona gigas*) of the Andes, which, Darwin says, whilst hovering over a flower flaps its wings with a very slow and powerful movement, totally different from that vibratory one common to most of the species, which produces the hum-

ming noise. He "never saw any other bird where the force of its wings appeared (as in a butterfly) so powerful in proportion to the weight of its body. When hovering by a flower, its tail is constantly expanded and shut like a fan, the body being kept in a nearly vertical position." Mr. Darwin does not say whether any sound is produced by the wings of this species; but I am informed by Mr. W. E. Safford, U. S. Navy, who has frequently observed them, that the flight of the Giant Humming Bird is as noiseless as that of a butterfly.

Those Humming Birds, with elongated spatule-tipped tail feathers are to a degree peculiar in their flight, although the motion of the wings themselves is essentially the same as in ordinary kinds. The late Mr. Dyson informed Mr. Gould that the flight of these Racquet-tailed Hummers is very peculiar, and that their appearance in the air is most singular; the tail being not only constantly opened and shut, but the spatules always in motion, particularly when the bird is poising over a flower.

Although the muffled buzzing or humming noise, which has given this family of birds its distinctive name is the sound usually accompanying the flight of Humming Birds, the males of some species accompany their flight with a most remarkable noise, of an entirely different character. While among the mountains of Utah, in 1869, the writer was for a long time mystified by a shrill screeching noise, something like that produced by a rapidly revolving circular saw when rubbed by a splinter. This noise was evidently in the air, but I could not discover its origin, until I discovered a Humming Bird passing through the air overhead in a curious undulating line of flight. I afterwards heard the same sound produced by males of the same species (the Broad-tailed Humming Bird, *Selasphorus platycercus*), when they were driving other birds away from the vicinity of their nests. At such times they would ascend almost perpendicularly to a considerable height, and then descend with the quickness of a flash at the object of their animosity, which was perhaps more frightened or annoyed by the accompanying noise than by the attack itself.

Mr. F. Stephens,* calls this the "courtship song," but from the circumstance that, in the Broad-tailed Humming Bird at least, it is often produced by solitary individuals while wending their way between distant points, I hardly think it can properly be so considered. Writing of Costa's Humming Bird (*Calypte costae*), he says:

The female is sitting on a twig in a low bush, not on an exposed twig as is often the case when she is merely resting, but when the male begins she goes farther in, as if she feared that he really intended mischief, while he rises high in the air, and, with a headlong swoop, comes down, passing her, and turning with a sharp curve as near her as is possible mounts on high to repeat the maneuver again and again. A shrill whistle is heard as he begins to descend, starting low and becoming louder and louder, until as he passes her it becomes a shriek which is plainly audible for a distance of 100 yards or more. As he mounts again it dies away only to be repeated

* Bulletin of the Ridgway Ornithological Club of Chicago, No. 2, 1887, pp. 44, 45.

at the next descent. This is a common maneuver with the species. The whistle made during the descent was quite low and the buzzing sound made as he passed the other bird, a young *T. costae*, was coarser than I had heretofore thought. It also lacked all whistling character. I also noticed another swooping back and forth, but heard no whistle or other vocal sound.

Mr. Henshaw* also is inclined to think that this sound, in the Broad-tailed Hummer (*Selasphorus platycercus*), at least, is "analogous to the love-notes of other birds." Says he:

During the mating, and perhaps also through the entire breeding season, the flight of the male is always accompanied by a curious, loud, metallic, rattling noise, which he is enabled to produce in some way by means of the attenuation of the outer primaries. This is, I think, intentionally made, and is analogous to the love notes of other birds. Though I saw many of these birds in the fall, it was only very rarely that this whistling noise was heard, and then with greatly diminished force.

DISPOSITION.

In their disposition Humming Birds are not only very tame but highly curious or inquisitive, and exhibit a special propensity to closely inspect a human intruder to their domains. One of these little feathered fairies will at such times approach like a flash and poise directly before one's face, its wings vibrating so rapidly as to appear as a mere haze on each side of its body, which itself remains so stationary that the inquiring expression of its bright black eyes and the outline of nearly every feather of its compact little figure can be seen; then it shifts rapidly to one side, then to the other, and approaches so near as to be easily within reach of the hand; but the slightest demonstration causes it to vanish so swiftly that the eye can scarcely trace the line of its flight.

The charming confidence in the human species shown by Humming Birds when they are treated considerately is well illustrated by an anecdote related by Lady Emeline Stuart Wortley in her "Travels." A pair of the minute Vervain Hummer (*Mellisuga minima*) had built their nest close to one of the walks of the garden of the place where she was staying.

The branch, indeed, of the beautiful shrub in which this fairy nest was suspended almost intruded into the walk; and every time we sauntered by there was much danger of sweeping against this projecting branch with its precious charge and doing it some injury, as very little would have demolished the exquisite fabric. In process of time two lovely pea-like eggs had appeared; and while we were there we had the great pleasure of seeing the minute living gems themselves appear, looking like two very small bees. The mother bird allowed us to look closely at her in the nest and inspect her little nurslings, when she was flying about near, without appearing in the least degree disconcerted or alarmed. I never saw so tame or so bold a pet. But she did not allow the same liberties to be taken by everybody unchecked. One day, as Sir C—— was walking in the pretty path beside which the fragile nest was delicately suspended amid sheltering leaves, he paused in order to look at the lilliputian inhabitants. While thus engaged he felt suddenly a sharp light rapping on the crown of his hat, which considerably surprised him. He looked round to ascertain

* Report on Ornithological Specimens, Wheeler's Expedition, p. 88.

from whence the singular and unexpected attack proceeded; but nothing was to be seen. Almost thinking he must have been mistaken, he continued his survey, when a much sharper and louder tat-tat-tat-tat seemed to demand his immediate attention, and a little to jeopardize the perfect integrity and preservation of the fabric in question. Again he looked round, far from pleased at such extraordinary impertinence, when what should he see but the beautiful, delicate Humming Bird, with ruffled feathers and fiery eyes, who seemed by no means inclined to let him off without a further infliction of sharp taps and admonitory raps from her fairy beak. She looked like a little fury in miniature—a winged Xantippe. Those pointed attentions apprised him that his company was not desired or acceptable; and, much amused at the excessive boldness of the dauntless little owner of the exquisite nest he had been contemplating, Sir C—— moved off, anxious not to disturb or irritate further this valiant minute mother, who displayed such intrepidity and cool determination. As to V—— and me, the darling little pet did not mind us in the least; she allowed us to watch her to our heart's content during the uninterrupted progress of all her little household and domestic arrangements, and rather appeared to like our society than not, and to have the air of saying, "Do you think I manage it well, eh?"

The following account* of the taming of wild Humming Birds also shows how easily, with a little pains, these lovely creatures can be tamed:

A lady residing at San Rafael, one of the many pleasant health resorts of California, has sent to friends in London an account of the taming of two wild Humming Birds by her daughter, who, under medical direction, has for some months passed several hours daily reclining on rugs spread on the garden lawn. "E. has a new source of interest," her mother writes. "The humming birds have claimed her companionship and manifested their curiosity by inspecting her, with their little wise heads turned to one side, at a safe distance, watching her movements, evidently wishing to become acquainted. To entice them to a nearer approach, E. plucked a fuchsia, attached it to a branch of a tree over her head, and filled it with sweetened water. The intelligent little creatures soon had their slender bills thrust into the flower, from which they took long draughts. Then E. took honey, thinking they might prefer it, and filled a fresh flower each day. They would sometimes become so impatient as scarcely to wait for her to leave before they were into the sweets, and, finally, while she held a flower in one hand and filled it with drops from a spoon, the now tame little pets would catch the drops as they fell, and dart into the honey cup their silvery, thread-like tongues. E. is delighted, and so fascinated with them that she passes hours each day of her resting time talking to them and watching their quick, lively movements. Although these tiny birds are humming all day among the flowers, two only have monopolized the honey-filled flower, and these are both males, consequently there are constant squabbles as to which shall take possession. They will not permit a wasp or a bee to come near their honey flower, and not only drive them away, but chase them some distance, uttering a shrill note of protest against all intruders." Referring to them again, at the close of the rainless California summer, in a letter dated October 26, this lady writes: "We have had threatening clouds for two days and a heavy rainfall to-day. E. has continued her devotion to her little Humming Birds. Since the change of weather she has tried to coax them to the parlor windows. They appeared to think there must be some mistake, and would hum about the window where she stood with the honey flower and spoonful of honey, or they would sit on a branch and watch every movement, yet not daring to take a sip until to-day, when at her peculiar call, which they always recognize, one ventured repeatedly to take the honey from her hand.

Though so readily accustomed to the society of human beings, Humming Birds do not, unfortunately, long survive confinement. Whether

* Taken from the "Scientific American."

it is the want of sufficient exercise, or some other unknown cause, they invariably die within a few weeks, or months at the longest, of their capture. The first attempt to transport them alive across the Atlantic seems to be the one related by Latham, as follows :

"A young gentleman, a few days before he sailed from Jamaica for England, met with a female Humming Bird sitting on the nest and eggs, and cutting off the twig, he brought altogether on board. The bird became sufficiently tame to suffer herself to be fed on honey and water during the passage, and hatched two young ones. The mother, however, did not long survive, but the young were brought to England, and continued for some time in the possession of Lady Hammond. The little creatures readily took honey from the lips of Lady Hammond, and though the one did not live long, the other survived for at least two months from the time of their arrival."

Mr. Gould was partially successful in his attempt to carry living specimens of the Ruby-throat (*Trochilus colubris*) to England, his experience being related as follows :

"A *Trochilus colubris* captured for me by some friends in Washington . . . immediately afterwards partook of some saccharine food that was presented to it, and in 2 hours it pumped the fluid out of a little bottle whenever I offered it; and in this way it lived with me a constant companion for several days, traveling in a little thin, gauzy bag distended by a slender piece of whale bone and suspended to a button of my coat. It was only necessary for me to take the little bottle from my pocket to induce it to thrust its spiny bill through the gauze, protrude its lengthened tongue down the neck of the bottle, and pump up the fluid until it was satiated; it would then retire to the bottom of its little home, preen its wings and tail-feathers, and seem quite content.

The specimens I brought alive to this country were as docile and fearless as a great moth or any other insect would be under similar treatment. The little cage in which they lived was 12 inches long by 7 inches wide and 8 inches high. In this was placed a diminutive twig of a tree, and, suspended to the side, a glass vial which I daily supplied with saccharine matter in the form of sugar or honey and water, with the addition of the yolk of an unboiled egg. Upon this food they appeared to thrive and be happy during the voyage along the seaboard of America and across the Atlantic, until they arrived within the influence of the climate of Europe. Off the western part of Ireland symptoms of drooping unmistakably exhibited themselves; but, although they never fully rallied, I, as before stated, succeeded in bringing one of them alive to London, where it died on the second day after its arrival at my house. The vessel in which I made the passage took a northerly course, which carried us over the banks of Newfoundland, and, although the cold was rather severe during part of the time, the only effect it appeared to have upon my little pets was to induce a kind of torpidity from which, however, they were readily aroused by placing them in the sunshine or in some warm situation, such as before a fire, in the bosom, etc. I do assure my readers that I have seen these birds cold and stiff, and to all appearances dead, and from this state they were readily restored by a little attention and removed into light and heat, when they would "perk up," flutter their little wings, and feast away upon their usual food as if in the best state of health.

The experience of Mr. Gosse in his attempt to domesticate the beautiful Long-tailed Humming Bird of Jamaica (*Aithurus polytmus*) was equally discouraging.

Some [says he] were taken with the net, others with birdlime, but though transferred to a basket or to a cage immediately on capture, not a few were found dead on arrival at home. This sudden death I could not at all account for; they did not

beat themselves against the sides, though they frequently clung to them. From the wild look of several that were alive when arrived, sitting on the bottom of the cage looking upward, I suspect terror at their capture and novel position had no small influence. Many of those which were found alive were in a dying state, and of those which were turned out into the room several more died in the first 24 hours, generally because, not observing the lines which the domesticated ones used as perches, they would fly against the perpendicular walls, where, after fluttering awhile suspended, they would at length sink exhausted perpendicularly downwards, the wings still vibrating, and alight on the object that intercepted their downward course. If this was the floor they would presently rise on the wing, only again to flutter against the wall as before; but often it would happen that they would sink behind some of the many boxes with which the shelves were lumbered, in which case, the space being too narrow for the use of their wings, they soon died unobserved, and were found dead only upon searching. This was the fate of many, so that out of the 25 only 7 were domesticated. These, however, became quite at home; and I may here observe that there was much difference in the tempers of individuals, some being moody and sulky, others very timid, and others gentle and confiding from the first. I have noticed this in other birds also.

Those which survived the longest, however, finally died, and the cause of their death he conjectured to have been the want of insect food, and that, notwithstanding their frequent sipping at the syrup they were really starved to death. He was led to this conclusion by having found, on dissecting those which died, that they were excessively meagre in flesh, and that the stomach, which ordinarily is as large as a pea, and distended with insects, was in these shrunk to a minute collapsed membrane.

Notwithstanding their diminutive size, pugnacity is one of the most conspicuous traits of Humming Birds. Particularly is this true of the male during the breeding season, when not only are others of the same species which imprudently approach the vicinity of his nest promptly attacked and driven away, but other and much larger birds also; even King Birds and the boldest hawks beat a precipitate retreat before the impetuous assaults of the tiny warrior, whose boldness is only equalled by the lightning-like rapidity of his movements, thus baffling any attempt at resistance on the part of the more powerful adversary. Intruders of the human species are not, under such circumstances, always exempt from his vehement attacks, but oftener, perhaps, the little champion is content with mere "skirmishing" demonstrations.

It is not only when defending their nest or young that Humming Birds display this combative spirit, nor is it confined to the male alone; for, when two or more individuals, of either sex, happen near the same spot, spirited and often violent conflicts are almost certain to ensue. Such a contest is very accurately and graphically described by a writer in "Forest and Stream"* as follows:

I was walking along one of the streets of this village, and passed by a flower garden where a large bed or bush of *salvia* grew against the front palings. The plant or plants was filled with a great profusion of bright red flowers, some of which reached

* "Coahoma," in the issue of October 24, 1889. The species is the common Ruby-throat, and the locality Cambridge, Mississippi.

above the fence. Hovering over these were two Humming Birds whose coats of metallic sheen glistened in the sun like burnished gold and silver. The little creatures darted hither and thither, inserting their long bills into the tube-like flowers with absolute precision and lightning-like rapidity, but all the while engaged in a fierce combat with each other. They constantly maintained a position facing one another, and only 6 or 8 inches apart, suddenly rising a dozen feet into the air, where they would have a little battle, and as suddenly dropping like two bullets on one string back to the flowers, over and among which they would flit about like animated sun-beams.

Occasionally they would "hitch" and flutter all the way to the ground through the leaves and branches, where they would lie and pummel each other like two school-boys, one on top and the other beneath, the top fellow pausing to take breath and then pummeling some more.

The under bird would appear to give up and look very dilapidated, with outstretched wings and disordered feathers, but the moment the top fellow let go and rose up to the top of the bush the bottom one would be there facing him again.

The most interesting feature of the performance was their utter obliviousness to my presence. As I stood near the palings watching them, which I did for a quarter of an hour, they would flutter around my head and about my face, occasionally striking me with their fluttering wings on face and hands, and one of them lighted for a moment on my thumb.

One now and again lighted on a picket within a foot of me and gave a quick side glance toward me, which was the only notice I appeared to excite from them. At last one of them retired, vanquished, and the other exultantly took possession of the flowers.

More graphically perhaps than by any other writer is this combative spirit of the Humming Bird described by Mr. H. W. Henshaw, in an interesting article on the birds of the Upper Pecos River, New Mexico, in "The Auk" for January, 1886 (pp. 76, 77), the species described being the Rufous-backed Hummer (*Selasphorus rufus*):

Males and females all flock to the common feeding ground, and as the Hummers, especially of the Rufous-backed species, are pugnacious and hot tempered in the extreme, the field becomes a constant battle ground whereon favorite flowers and favorite perching grounds are contested for with all the ardor that attaches to more important conquests. The fiery red throat of the Rufous-backed Hummer is an index of impetuous, aggressive disposition, and when brought into conflict with the other species it invariably asserts its supremacy and drives its rival in utter rout from the field. Nor do the males of this species confine their warfare to their own sex. Gallantry has no place apparently in their breasts, and when conquest has put them in possession of a perch near a clump of flowers they wage war on all comers, females as well as males.

Nor is the pugnacity of this Humming Bird limited to attacks on other species. The presence of a male of its own kind is sufficient to arouse it to the highest pitch of fury, and should the contestants be equally matched they will seize each other by the bill and, using their wings as offensive weapons, fall to the ground, roll over and over in fierce strife until exhausted, or until one is worsted, when he is off like a bullet for less dangerous hunting grounds followed by the exulting victor, who, however, soon gives over pursuit and returns to the perch he has so well won to preen his disordered plumage and make ready for a fresh contest.

When the attack is urged against the males of the Broad-tailed species the contest is less fierce, the latter species usually abandoning the ground in hot haste. The latter result always follows the assault of a male upon the females who, if less valiant in battle, are scarcely backward when it comes to the assertion of their rights against intruders of their own sex. The rivalry the females display is not less marked if the battles it prompts are less fierce than when the males are engaged;

occasionally the females will fight with all the ardor displayed by the males. The mimic contests thus hinted at rather than described—for the fury and spirit displayed in their battles must be seen to be appreciated—are continued all day long, and were the strength of the combatants at all proportionate to their fury the problem of Humming-Bird life would simply resolve itself down to a question of the survival of the strongest. But the tiny strength of these pigmies, though backed by never so much warlike spirit, is scarcely sufficient to detach a feather from each other's gleaming bodies, and even at the close of the season the male birds show little wear and tear and are in prime condition as regards their plumage.

If they have occasion to fear each other—and sometimes I have thought they fight merely for the pure fun of it—they fear nothing else. About our camp, where were a few clumps of the *Scrophularia*, they were especially fearless, and provided one remained reasonably quiet they would approach within 2 or 3 feet. When in such proximity their sharp eyes were constantly on the watch, and a hostile movement sent them away like streaks of flame. By gradual approach, however, I was able on several occasions to strike one down with my hat and secure it uninjured before it recovered either presence of mind or strength to get on wing.

On another occasion, Mr. Henshaw observed that "they manifested an especial animosity against the Broad-tailed Hummer (*Selasphorus platycercus*), and, on the appearance of one would instantly dart forth with shrill, angry notes, and attack and drive away the intruder, while the female, sitting on some neighboring tree, would watch the oft-repeated contest with evident interest and solicitude."

Dr. Edgar A. Mearns once saw a Ruby-throat (*Trochilus colubris*) attack a pair of Downy Woodpeckers upon the tree which it had chosen for its nest, and drive them off, while he also saw one dart furiously at a small red toy balloon which a boy was flying in a field.

That their contests with one another are not always of a sportive character, as suggested by Mr. Henshaw, is shown by Mr. Gosse's observations on the Jamaican species, which are recorded as follows:

The pugnacity of the Humming Bird has been often spoken of; two of one species can rarely suck flowers from the same bush without a rencontre. I once witnessed a combat between two, which was prosecuted with much pertinacity and protracted to an unusual length. In the garden were two trees of the kind called Malay Apple (*Eugenia malaccensis*), one of which was but a yard or two from my window. The genial influence of the spring rains had covered them with a profusion of beautiful blossoms, each consisting of a multitude of crimson stamens, with very minute petals, like bunches of crimson tassels; but the leaf buds were only beginning to open. A Humming Bird had every day and all day long been paying his devoirs to these charming blossoms. On the morning to which I allude, another came, and the maneuvers of these two tiny creatures became very interesting. They chased each other through the labyrinths of twigs and flowers, till, an opportunity occurring, the one would dart with seeming fury upon the other, and then, with a loud rustling of their wings, they would twirl together round and round, till they nearly came to the earth. It was some time before I could see, with any distinctness, what took place in these tussles; their twirlings were so rapid as to baffle all attempts at discrimination. At length an encounter took place pretty close to me, and I perceived that the beak of the one grasped the beak of the other, and thus fastened both whirled round and round in their perpendicular descent, the point of contact being the center of the gyrations, till, when another second would have brought them both on the ground, they separated, and the one chased the other for about 100 yards, and then returned in triumph to the tree, where, perched on a lofty twig, he chirped monotonously and pertinaciously for some time—I could not help thinking, in

defiance. In a few minutes, however, the banished one returned and began chirping no less provokingly, which soon brought on another chase and another tussle. I am persuaded that these were hostile encounters, for one seemed evidently afraid of the other, fleeing when the other pursued, though his indomitable spirit would prompt the chirp of defiance; and when resting, after a battle, I noticed that this one held his beak open as if panting. Sometimes they would suspend hostilities to suck a few blossoms; but mutual proximity was sure to bring them on again, with the same result. In their tortuous and rapid evolutions, the light from their ruby necks would occasionally flash in the sun with gem-like radiance, and as they now and then hovered motionless, the broadly-expanded tail, the outer feathers of which are crimson-purple, but when intercepting the sun's rays transmit orange-colored light, added much to their beauty. A little Banana Quit (*Certhiola flaveola*), that was peeping among the blossoms in his own quiet way, seemed now and then to look with surprise on the combatants; but when the one had driven his rival to a longer distance than usual, the victor set upon the unoffending Quit, who soon yielded the point, and retired humbly enough to a neighboring tree. The war (for it was a thorough campaign, a regular succession of battles) lasted fully an hour, and then I was called away from the post of observation.

While invincible against other birds of whatsoever kind, Humming Birds are, according to Mr. Gould, sometimes chased by the larger kinds of bumblebees, of which they seldom take the least notice, as their superiority of flight is sufficient to enable them to leave those slow-moving insects far behind in the short space of a minute.

INTELLIGENCE.

Mr. Gould refers to the high order of intelligence "so nearly approaching to that of reason" possessed by Humming Birds, and others add their testimony to that presented by him. This great intelligence is most obvious in connection with their nesting, when some kinds, in certain exigencies, seem really to possess a distinct knowledge of the laws of equilibrium and gravitation, as the following will show:

Some of the Humming Birds [says Mr. Gould] are said to suspend their great nests by the middle from the fine hanging roots of a tree, or a tendril; and should the nest, which is of a curved form and built of any coarse materials at hand, prove to be heavier on one side than the other, the higher side is weighted with a small stone or square piece of earth until an equilibrium is established and the eggs prevented from rolling out. If such powers, so nearly approaching to that of reason, should be doubted by some of my readers, I can assure them one or more of these loaded nests are contained in the Loddigesian Collection, and one is at this moment before me, an examination of which will satisfy the most skeptical of the truth of this statement. Occasionally the old nests are repaired or [new ones are] built over the old one, two, three, or more years in succession.

The Humming Birds which thus display so much intelligence belong to the genus *Oreotrochilus*, the species of which inhabit the higher regions of the Andes immediately below the line of perpetual snow. One of them, the Pichincha Humming Bird (*Oreotrochilus pichincha*), builds a nest similar to that described above, but usually secures the equilibrium of the nest by simply adding to the ordinary materials on one side, thus by increasing the bulk on that side also adding to the weight.*

*A nest of this species is shown on plate VI, Fig. 2.

A nest of *Doricha enicura* found by Mr. Salvin in Guatemala further illustrates the remarkable reasoning faculties of Humming Birds. It "was most curiously placed in the cup-shaped top of a fruit of the Nopal (*Cactus cochinellifera*), the fastenings being dexterously wound round the clustering prickles and thus retaining the whole structure firmly in its place." It was remarkably shallow, so much so, in fact, that had it not contained two eggs Mr. Salvin "would have pronounced it far from complete;" and he adds that "it may be that, being based on a firm foundation (one not nearly so liable to oscillation by the wind), the bird had found that a greater depth was not necessary to keep the eggs from falling out. Had she placed her nest on a slender twig, as usual, the case might have been different." (The Ibis, vol. II, p. 264.)

An extraordinary and most convincing exhibition of a Humming Bird's intelligence once came under the personal observation of the writer. A nest of the Broad-tailed Humming Bird (*Selasphorus platycercus*) had been built upon a dead twig of an aspen bush, some 3 feet from the ground; the dry atmosphere had caused the bark of the twig to crack, making a transverse fissure on each side of the nest, the wood at the same time shrinking so that the cylinder-like section of bark inclosed it loosely. After the eggs were laid something had caused the section of bark to turn, so that the nest hung inverted on the under side of the branch, of course spilling out the eggs. When found by the writer the nest was in this position, with the fragments of the eggs lying on the ground beneath it; but immediately above the original nest was a new one, very much smaller than the first, containing two fresh eggs. Evidently the owners knew that by building a much smaller nest above the old one (which was rather a bulky one for the species) the greater weight of the latter would keep the former in position and thus prevent a recurrence of the accident.

Mr. C. H. Holden was "struck with the wisdom" of this same species in the matter of nest-building, a nest which he found in the Black Hills of Wyoming having been built upon one of the lower branches of a tree that had fallen across a brook, in such a way that the trunk of the tree effectually shielded it from the rain and sun.

Other Humming Birds, again, build their nests of materials corresponding exactly in color with the branches to which they are attached, this being frequently the case with the Calliope Humming Bird (*Stellula calliope*) of the western United States, which often builds its nest upon a dead pine branch, upon or near a cone of similar size and color, as shown on plates II and III, while some of the tropical species, of the genus *Phaethornis*, attach theirs to the tip of a long pendant leaf of a palm, as shown on plates IV and V.

NESTS AND EGGS.

Humming Birds' nests are among the most beautiful examples of bird architecture. They are usually compactly felted structures, of various forms, the cup-shaped or turban-shaped, however, prevailing, the ma-



FOUR NESTS OF CALLIOPE HUMMING BIRD (*Stellula calliope*) on one branch, probably built during successive seasons. (Cat. No. 18915, U. S. N. M. Baird, California. Collected by Charles H. Townsend.)



NEST OF CALLIOPE HUMMING BIRD (*Stellula calliope*) on dead pine branch with cones. (Cat. No. 21758, U. S. N. M. Fort Klamath, Oregon. Collected and presented by Capt. Charles E. Bendire, U. S. A.)



NEST OF CALLIOPE HUMMING BIRD (*Stellula calliope*) on dead branch of pine, canopied by and mimicking cone. (Cat. No. 21759, U. S. N. M. Fort Klamath, Oregon. Collected and presented by Captain Charles E. Bendire, U. S. A.)

terials of which they are composed consisting chiefly of plant down, interwoven and strengthened by spiders' webs, and often ornamented by an external mosaic of small lichens, small soft feathers being more rarely employed. Their method of attachment to their support varies greatly according to the species. Ordinarily the nest is saddled upon a horizontal or slanting twig, to which it is very firmly bound by the spiders' webs of which it is largely composed. -The Hermit Humming Birds (genus *Phaëthornis*), however, fasten their elongated nests to one side of the extremity of long pointed leaves, for protection, it is supposed, against monkeys and other predaceous animals. Others, according to Mr. Gould, are hammock-shaped, and are most ingeniously attached to the face of cliffs or rocks by means of spiders' webs. Those made by the "Hill-stars" (genus *Oreotrochilus*), of the snowy regions of the Andes, are described by Mr. Gould as being "very large, and composed of wool, llama hair, moss, and feathers; at the top of this great mass, of nearly the size of a man's head, is a little cup-shaped depression in which the eggs are deposited." A nest of the Pichincha Hill-star (*O. pichincha*) was found by Professor Jameson at a farm-house on the snowy mountain of Antisana, in Ecuador, at an altitude of 13,500 feet. It was attached to a straw rope suspended from the roof, in one of the lower apartments to the house, the entrance to which was unprovided with a door. (See pl. VI, fig. 2.) In the series of illustrations comprising plates II-XIV we have selected examples of the extreme variations of form and other characters in Humming Bird nest architecture, and to these the reader is referred for further information.

The high degree of intelligence displayed by Humming Birds in concealing their nests by making them of such form or material as will serve to imitate natural excrecences of a branch, such as a knot or a pine cone, and in repairing accidents, has been referred to on the preceding page. Sometimes the location of a nest pleases the owners so well that they are unwilling to abandon the site, a new nest being added to the one of the preceding year for several consecutive seasons. A beautiful example of this is shown on plate I. The specimen from which the illustration is taken is a nest of the Calliope Humming Bird (*Stellula calliope*) in the National Museum collection, collected by Mr. Charles H. Townsend on the St. Cloud River, northern California, June 9, 1883, and shows distinctly *four* nests thus united. The writer once found a double nest of the Broad-tailed Humming Bird (*Selasphorus platycercus*), the older one having, by the loosening and cracking of the bark to which it was fastened, fallen around on the under side of the twig, the new one being built immediately above it (see page 282). A double nest of the Ruby-throat (*Trochilus colubris*) is described by Mr. Edwin H. Eames in "The Hub" for July, 1890 (pp. 286, 287), as follows :

On June 5, 1888, I secured a nest, containing one young bird and an egg on the point of hatching, of the Ruby-throated Humming Bird. The nest is a very peculiar one, being constructed upon one of the preceding year, and in a very conspicuous sit-

nation upon a branch of a sycamore, which inclined at an angle of 45 degrees. It was about 12 feet from the ground, on the lowest branch (a dead one), with no foliage whatever to afford concealment, and could be readily seen from a distance of 60 to 75 feet in any direction.

The old nest is much the worse for wear, having passed through at least one winter; the new one was built partly on one edge of this and partly on the adjoining branch, leaving fully one-half of the distorted cavity at the base exposed. The entire external surface of both is covered in the usual way with lichens, although not in any way resembling the smooth, mottled surfaces adjoining. It would seem that the scenes of bygone associations have some permanent attractions, even though comparatively barren to our eyes.

While, as a rule, but little attempt is made at concealment by hiding it behind foliage in the usual manner of most birds, so much does the nest of the average Humming Bird resemble some natural excrescence or bit of rubbish that it might easily pass undetected. In fact, most Humming Birds' nests which are discovered are found by accident or by carefully watching the movements of the birds when they are suspected to have a nest in the vicinity; and all that the writer has found, with perhaps two or three exceptions, were discovered by accidentally brushing against the bush or branch on which it was located, causing the parent to hastily fly out and thus betraying its proximity.

The eggs of Humming Birds are universally only two in number and immaculate white in color, though, according to Mr. Gould, there is "one supposed exception, namely, that of a species inhabiting the upper Amazon, which, according to Mr. Edwards, lays a spotted egg." But there can be little doubt that this supposed exception does not in reality exist, the egg of some small Passerine bird having been wrongly identified as that of a Humming Bird.

The eggs of Humming Birds are large in comparison to the bird which lays them; in form they are usually oblong, or nearly alike at both ends, though sometimes one end is a little smaller than the other; the color, even when freshly laid, is a nearly dead pure white, the comparative thickness of the shell preventing that pinkish glow so frequently seen in eggs of small Passerine birds.

According to Mr. Gould two broods are produced in a season, the period of incubation occupying 12 to 14, or according to Captain Lyon, 18 days.

VOICE.

The voice of Humming Birds, as a rule, is of a twittering character, not conspicuous for loudness or any other quality, and may be compared with the vocal utterances of the Swifts better perhaps than those of any other group of birds. The notes are of course varied to a degree, according to the mood of the bird which utters them, anger, pleasure, and alarm each calling forth its peculiar expression. Some species are said to possess a song, but it is doubtful if any approach more nearly to a song than a sort of warbling twitter, which the males of many kinds produce during the pairing season. Mr. Gosse says that the Vervain



NESTS OF GRAY-THROATED HERMIT (*Phaethornis griseigularis*). (After Gould.)



NEST OF PYGMY HERMIT (*Phaethornis pygmaeus*). (After Gould.)

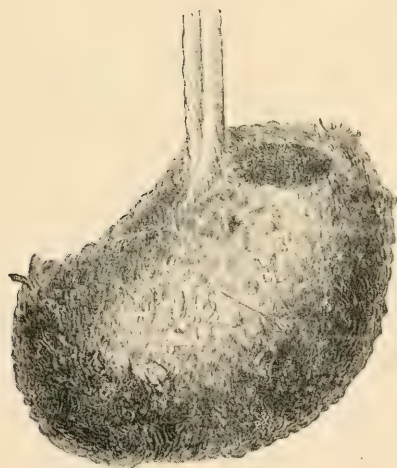


Fig. 1. NEST OF FRILLED COQUETTE (*Lophornis magnificus*). (After Gould.)

Fig. 2. NEST OF PICHINCHIAN HILL-STAR (*Oreotrochilus pichincha*). (From Proc. Zool. Soc. London, 1860, p. 80. Half natural size.)



NEST OF ALLIED EMERALD (*Agyrtia affinis*). (After Gould.)



NEST OF BRAZILIAN EMERALD (*Chlorostilbon prasinus*). (After Gould.)



NEST OF RED-THROATED SAPPHIRE (*Hylocharis sapphirina*). (After Gould.)



NEST OF BRAZILIAN WOOD NYMPH (*Thalurania glaucopsis*). (After Gould.)



NEST OF SHORT-BILLED EMERALD (*Agyrtria brevirostris*). (After Gould.)



NEST OF THE SPARKLING-TAIL (*Tilmatura duponti*). (After Gould.)



NEST OF FIERY TOPAZ (*Topaza pyra*). (After Gould.)



NEST OF DE LALAND'S PLOVER-CREST (*Cephallepis delalandi*). (After Gould.)

Humming Bird (*Mellisuga minima*) of Jamaica is the only one known to him which has a real song. Soon after sunrise, says he, in the spring months, it is fond of sitting on the topmost branch of a mango or orange tree, where it warbles in a very weak but very sweet tone a continuous melody for 10 minutes at a time, but the so-called song has little variety. A Mexican Humming Bird (the Wedge-tailed Sabre-wing, *Sphenoproctus curripennis*), according to Mr. R. Montes d'Oca, is called by the people of Coatepec, near Jalapa, *Chupamirto fandanguero*, which means "Fandango Myrtle-sucker," on account of its somewhat musical voice. It is the only Humming Bird of his acquaintance whose notes are sufficiently distinctive to recognize it by in the woods, and though monotonous they are very pleasing.

Speaking of the notes of several of the Humming Birds of Arizona, Mr. F. Stephens * says that of *Calypte costae*, the female, while feeding, keeps up a pretty constant vocal noise which somewhat resembles the buzz of the wings, and that the feeding note of the male is finer and not so frequent. Of *Trochilus alexandri* he says that its notes, both of the male and the female, are similar to those of *C. costae*.

I have heard the song of each [says he], but it was some time since, and, as I remember it, there was little difference between the two species. I think that the males are the only ones who sing. The song is sweet and very low, but if it is perfectly quiet around it can be distinctly heard for a distance of 10 yards. As might be expected from the size of the bird, it is on a very high key, something like the sound produced by whistling between the teeth, very low yet at a high pitch. It might be called a warble, and I have heard it kept up for several minutes at a time. At such times I have never been able to find a female in the vicinity, and have come to the conclusion that it was sung for the individual's own amusement.

There is still another Hummer note—that of the chase. They are very fond of chasing one another, sometimes for sport, often for spite. This note also resembles the feeding note, but is louder and possesses a chippering character, sometimes almost like the sound produced by lightly and rapidly smacking the lips together. I can detect but little difference between the sexes and it appears much the same whether the chase is in sport or in anger. Furthermore, it is often made by the pursued as well as the pursuer. At such times I am always reminded of a lot of schoolboys playing tag.

If a Hummer is perched and a person passes near they start off, uttering a note similar to that made while feeding, but, should it be a female which you have frightened from her nest, she will go off silently.

FOOD.

In feeding from flower to flower Humming Birds, besides obtaining nourishment for themselves, perform in the economy of nature the same office as insects, by transferring pollen from one bloom to another, and thus assisting in their fertilization.

Humming Birds that peer like bees
In stamen and in pistil.—MACKAY.

* Bulletin of the Ridgway Ornithological Club of Chicago. No. 2, April, 1887, pp. 42-45.

It is popularly supposed that Humming Birds feed entirely on nectar obtained from flowers, but it has long been known that insects form a portion of their food. This fact was established as long ago as 1804, by Dr. B. S. Barton, in an article in Barton's Medical and Physical Journal, part i, vol. i, pp. 88, 89. The evidence is somewhat conflicting as to whether insects or honey preponderate in the Humming Bird's bill of fare, but very probably the relative proportions of the two kinds of food vary under different circumstances. One observer (Mr. Manly Hardy, in *The Auk*, July, 1887, p. 255) asserts that they "sometimes feed the young on insects within 24 hours from the time they are hatched."

A young bird, about 2 days old, of the Ruby-throat (*Trochilus colubris*), taken by Mr. Edwin H. Eames, of Bridgeport, Connecticut, appears to have been fed exclusively on young spiders. He says:

Its throat being much distended, I sought the cause by lightly pressing with a dull instrument from the thorax toward the bill, and succeeded in bringing to light 16 young spiders of uniform size. These measured about 0.11 of an inch in length, and with outspread legs covered a circle of 0.26 of an inch in diameter. Dissection revealed a pulsatious mass of the same in the stomach, but no more liquid than would result during digestion of insects of this gelatinous character. They were all of the same species, and may have been young found about certain plants in the immediate vicinity. It is surprising that young Humming Birds of this age could thrive, as it would seem, entirely upon insects, although the quality be of the finest. (*The Auk*, July, 1890, p. 287.)

Mr. A. R. Wallace even goes so far as to state his belief that insects form the principal food of Humming Birds. He says: *

The great number of species that frequent flowers, do so, I am convinced, for the small insects found there, and not for the nectar. In dozens, and perhaps hundreds, of common flower-frequenting species which I have examined, the crop, stomach, and intestines have been entirely filled with minute beetles, bees, ants, and spiders, which abound in most flowers in South America. Very rarely, indeed, have I found a trace of honey or of any liquid in the crop or stomach. The flowers they most frequent are the various species of *Inga*, and the papilionaceous flowers of many large forest trees. I have never seen them at the Bignonias or any flowers but those which grow in large masses, covering a whole tree or shrub, as they visit perhaps a hundred flowers in a minute, and never stop at a single one. The little Emerald Hummer I have seen in gardens and at the common orange *Asclepias*, which often covers large spaces of waste ground in the tropics. But there are many, such as *Phaethornis cremita*, and some larger allied species, which I have never seen at flowers. These inhabit the gloomy forest shades, where they dart about among the foliage, and I have distinctly observed them visit, in rapid succession, every leaf on a branch, balancing themselves vertically in the air, passing their beak closely over the under surface of each leaf, and thus capturing, no doubt, any small insects that may be upon them. While doing this the two long feathers of their tail have a vibrating motion, serving apparently as a rudder to assist them in performing the delicate operation. I have seen others searching up and down stems and dead sticks in the same manner, every now and then picking off something, exactly as a Bush-Shrike or a Tree-creeper does, with the exception, that the Humming Bird is constantly on the wing. They also capture insects in the true Fissirostral manner. How often may they be seen perched on the dead twig of a lofty tree, the same station that is chosen by the Tyrant Flycatchers and the Jacamars, and from which, like those birds, they

dart off a short distance and, after a few whirls and balancings, return to the identical twig they have left. In the evening, too, just, after sunset, when the Goat-suckers are beginning their search after insects over the rivers, I have seen Humming Birds come out of the forest and remain a long time on the wing, now stationary, now darting about with the greatest rapidity, imitating in a limited space the varied evolutions of their companions the Goat-suckers, and evidently for the same end and purpose.

Many naturalists have noticed this habit of feeding on insects, but have generally considered it as the exception, whereas, I am inclined to think it is the rule. The frequenting of flowers seems to me to be only one of the many ways by which they are enabled to procure their insect food.

Mr. Wallace is probably correct in his belief that insects constitute their principal food so far as the Hermit Humming Birds (*Phaëthornis* and allied genera) are concerned, for these birds are quite different in many respects from the typical Humming Birds; but there can not be the slightest question that, as a rule, the typical hummers feed to a very large extent at least, on the honey or the nectar of flowers. His observation respecting their alleged avoidance of flowers of the *Bignoniaceæ* is also unimportant, since the common Ruby-throat (*Trochilus colubris*) of eastern North America may often be seen extracting its food from the large trumpet-shaped, brilliant orange-red flowers of the native Trumpet Creeper (*Tecoma radicans*), a typical member of that order of plants.

In fact, evidence is abundant and conclusive that Humming Birds will often reject insects when honey is accessible, or even an artificial sirup made of sugar and water is presented to them. Mr. W. H. Balou has recorded, in the "American Naturalist," the result of some experiments, suggested by Mr. Wallace's statements, which he made, as follows:

Two Hummers were attracted to the house by a saucer of sirup placed on a window sill. Each day they would come and satisfy their hunger. In each instance they would alight on the edge of the saucer, and lap up the sirup as a dog would lap water. The question as to whether insects "pass down the tubes or are entangled in the fibrous tips, and are thus drawn back into the gullet," was also solved. Insects too large to pass through these tubes being placed in their way, the birds were observed to take them as readily as the smaller ones. The insects were evidently secured by adhesion to the saliva of the tongue-tips, and thence drawn into the gullet.

The following, communicated to "The Auk," for April, 1885 (pp. 218, 219), by Mr. S. W. Willard, is also quite to the point:

Somewhere it has been stated, that the Humming Bird derives the most of its nourishment from the minute insects which adhere to the nectar of flowers, and which are imbibed with the honey. Undoubtedly many insects are thus secured and furnish their share of nutriment to the species, but in the following account of a Hummer in confinement, kindly furnished to me by Miss Hattie Brubaker, it will be seen that insects are not wholly essential to the maintenance of life, in *Trochilus colubris* at least.

The bird, she writes, was taken September 1, near De Pere, Wisconsin, and thrived nicely until October 23, when it met an untimely death. After it had struggled in vain for nearly 2 days to escape from a room into which it had accidentally flown, it was picked up in an exhausted condition and carefully placed out of doors in an arbor, in hopes of its recovering sufficiently to fly away. A severe cold rain that night

completely numbed it, so that it was again taken to the house a mere bunch of ruffled feathers—no life then being apparent. A slight warming quite unexpectedly revived it, and it was but a short time before it opened its eyes and flew to a nail, and then immediately began to rearrange its plumage. As flowers and sweetened water were offered to this captive before it was taken to the arbor, without its once noticing them, Miss Brubaker was rather at a loss to know how to feed it; but at last she conceived of placing some sugar and water in a conspicuous gladiolus blossom, which the Humming Bird soon discovered and visited, drinking greedily the honey that was in the blossom. After this it became quite lively, flying from its nail to some dried flowers and grasses in another room, where it had rested during the two days it had remained in the house without food or water.

With the aid of a petunia blossom as a decoy, this little bird was soon taught to drink from a small phial, holding about two teaspoonfuls of sugar and water (about one-third sugar), that was suspended by a string to the window casing. It was but a day or so before it seemed perfectly contented, not showing the least fear, but seemingly growing stronger as well as larger in its new home.

Miss Brubaker thinks the bird was not an old one, as its tail feathers grew considerably after she had it. She says that at first they kept a variety of cut flowers in the room with it, but it barely alighted upon them, flying at once to the bottle which it had learned to appreciate. Somewhat after the manner of obtaining nectar from a flower, it would sip a moment at the bottle and then dart away; but it was not long in finding that the supply of sweetened water was inexhaustible, and that there was no necessity of hastening its meal. At times it would drink so much that its wings were unable to sustain the weight of the body, and a fall to the floor was the result of its excessive fondness for this artificial nectar. When left to itself and no check put upon its drinking, it would consume at least half the contents of the phial daily—at least one-half as much as its own bulk.

"We are certain," she writes, "that for at least a month the bird had access to no flowers whatever, thus making it certain that the sweetened water furnished it its sole nourishment, and during this captivity it did not show the first signs of diminishing strength."

At the approach of cold weather it was placed in a cage, in which its little history was brought to a close by its accidentally entangling one of its claws in a loose wire which secured a small perch into the cage, and thus suspended with its head downward it was found by Miss Brubaker the next morning—another "bunch" of ruffled feathers.

The following very interesting description of the manner of feeding of the Long-tailed Humming Bird (*Aithurus polytmus*) is to be found in that delightful little book, Gosse's Birds of Jamaica:

Percceiving that he [the captive] had exhausted the flowers, I prepared a tube, made of the barrel of a goose-quill, which I inserted into the cork of a bottle to secure its steadiness and upright position, and filled with juice of sugar-cane. I then took a large *Ipomœa*, and, having cut off the bottom, I slipped the flower over the tube, so that the quill took the place of the nectary of the flower. The bird flew to it in a moment, clung to the bottle rim, and bringing his beak perpendicular, thrust it into the tube. It was at once evident that the repast was agreeable, for he continued pumping for several seconds, and, on his flying off, I found the quill emptied. As he had torn off the flower in his eagerness for more and even followed the fragments of the corolla as they lay on the table to search them, I refilled the quill and put a blossom of the Marvel of Peru into it, so that the flower expanded over the top. The little toper found it again, and, after drinking freely, withdrew his beak, but the blossom was adhering to it as a sheath. This incumbrance he presently got rid of, and then (which was most interesting to me) he returned immediately and, inserting his beak into the bare quill, finished the contents. It was

amusing to see the odd position of his head and body as he clung to the bottle with his beak inserted perpendicularly into the cork. Several times in the course of the evening he had recourse to his new fountain, which was as often replenished for him, and at length, about sunset, betook himself to a line stretched across the room for repose.

In view of the somewhat conflicting evidence as to whether insects or nectar constitute their principal food, it may be well to examine the structure of the tongue of Humming Birds, and by doing so determine, if possible, which side of the controversy is most favored thereby. No one has described the tongue of a Humming Bird so tersely as Mr. Gosse, whose description of the tongue of *Aithurus polytmus*, herewith given, was taken from freshly killed specimens:

The tongue of this species (and doubtless others have a similar conformation) presents, when recent, the appearance of two tubes laid side by side, united for half their length, but separate for the remainder. Their substance is transparent in the same degree as a good quill, which they much resemble. Each tube is formed by a lamina rolled up, yet not so as to bring the edges into actual contact, for there is a longitudinal fissure on the outer side, running up considerably higher than the junction of the tubes; into this fissure the point of a pin may be inserted and moved up and down the length. Near the top the *outer* edge of each lamina ceases to be convoluted, but is spread out, and split at the margin into irregular fimbriae which point backward, somewhat like the vane of a feather. These are not barbs, however, but simply soft and flexible points, such as might be produced by snipping diagonally the edge of a strip of paper. I conjecture that the nectar of flowers is pumped up the tubes, and that minute insects are caught, when in flowers, in these spoon-like tips, their minute limbs being perhaps entangled in the fimbriae, when the tongue is retracted into the beak, and the insects swallowed by the ordinary process, as doubtless those are which are captured with the beak in flight. I do not thoroughly understand the mode by which liquids are taken up by a Humming Bird's tongue, though I have carefully watched the process. If syrup be presented to one in a quill, the tongue is protruded for about half an inch into the liquor, the beak resting in the pen, as it is held horizontal; there is a slight but rapid and constant projection and retraction of the tubes, and the liquor disappears very fast, perhaps by capillary attraction, perhaps by a sort of pumping, certainly not by licking.*

CHARACTERS AND RELATIONSHIPS.

Art thou a bird, a bee, or butterfly?

"Each and all three—a bird in shape am I,
A bee collecting sweets from bloom to bloom,
A butterfly in brilliancy of plume."

—MONTGOMERY.

Humming Birds may be distinguished from all other birds by the structure of the wing alone, which is entirely peculiar in the excessive development of the primary and abbreviation of the secondary quills, the latter only six in number and not extending beyond the tip of the shortest (innermost) primary, and shorter than the longest primary coverts. The primaries are always ten in number, of which the first is longest, or at least equal to the longest, except in a single monotypic genus (*Aithurus*), and constitute much the greater part of the wing. The bill and tongue are also peculiar in their structure. The former is

* See, however, what Mr. W. H. Ballou says, on p. 287,

always slender, and when closed forms a tube by the inclosure of the under mandible between the flexible edges of the upper, the tip of both being acuminate. The tongue is slender and very extensile, like that of the woodpeckers, the two branches of the hyoid curving, when the tongue is drawn within the bill, upward around the back of the skull and then forward over the top of the head. Instead, however, of its being, as in the Woodpeckers, solid and tipped with a barbed horny point, it is hollow and divided at the tip into two slender branches, each of which is fringed on the outer margin by a thin membrane.

In all other characters, the Humming Birds possess nothing absolutely peculiar, although certain features, shared by other groups of birds, notably the Swifts (*Micropodidae*), are developed to an extreme degree; as, for example, the very high keel to the sternum and consequent excessive development of the pectoral muscles, the short arm-wing (humerus) and extremely long hand-wing (manus), and minute feet with relatively large, strongly curved, and sharp claws. The Humming Birds and Swifts further agree in numerous anatomical characters, and there can be no doubt that they are more closely related to each other than are either to any other group of birds. In fact, except in the shape of the bill and structure of the bones of the face, the Humming Birds and Swifts present no definite differences of osteological structure.

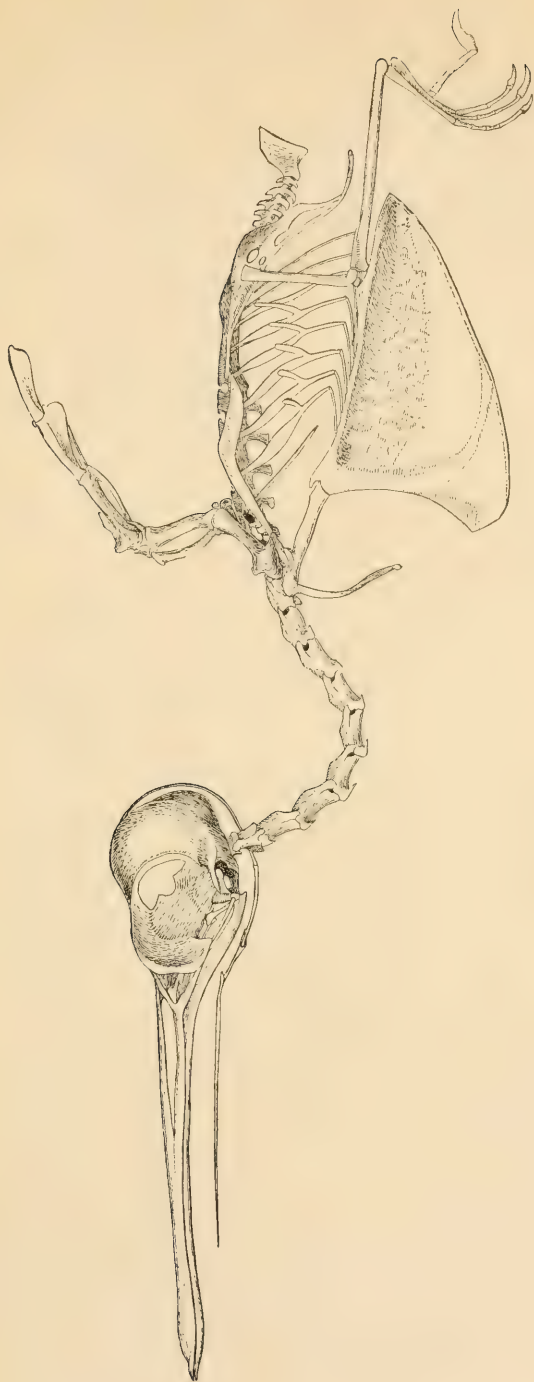
As being probably more familiar with the anatomy of Humming Birds than any other person, having made the subject one of special and painstaking investigation, Mr. Frederic A. Lucas, of the National Museum, has, at my request, prepared for this work a brief summary of the osteological and some other anatomical characters of the *Trochilidae*, which I take great pleasure in presenting herewith:

Pterylosis.—The manner in which the feathers of a bird are arranged is termed its *pterylosis*; and this varies in the different groups of birds, none, save the Penguins, having the body completely and evenly covered with feathers, the plumage ordinarily being distributed in well-defined patches, known as feather-tracts or *pterylae*, interspersed with bare spots called *apteria*.

Comparatively little is known of the *pterylosis* of Humming Birds, only a few out of the several hundred species having been thus described, but that of *Florisuga mellirora*, shown in the accompanying figures, does not differ materially from what has been found in other species. Like other characters, the *pterylosis* of Humming Birds seems to a great extent to be peculiar to the group, although both Humming Birds and Swifts agree in having the long, narrow, bare tracts down the back, and under the throat, as well as a similar disposition of the feathers on the under side of the body. Some of the Swifts, too, possess the bare space on the back of the neck, and, while this is usually quite short, yet in the species that makes the edible nests (*Collocalia fuciphaga*), and which has a very long neck, the nape tract is also long.

There is, however, one curious feature common to both these groups of birds, this being the existence of a small, naked patch near the tip of the wing, above and below, colored black. This is not known to occur at all among Passeres, and has not as yet been found in any of our small North American species of Humming Birds, although very conspicuous in many large southern forms, such as *Campylopterus*.

The *pterylosis* of all birds is more or less adaptive, having some direct relation to their habits, and this adaptation is well seen in Humming Birds. The bare tracts on



SKELETON of *Trochilus colubris*.
(Enlarged 2½ times.)

the nape and along the throat allow the neck to readily lie against the middle of the back, or to bend downward over the point of the breastbone, while the bare spaces under the wing and along the sides of the body permit the wings to be easily closed and applied to the body, the side spaces conforming almost exactly to the curve of the edge of the folded wing. The large bare space on the under side, found in nearly all

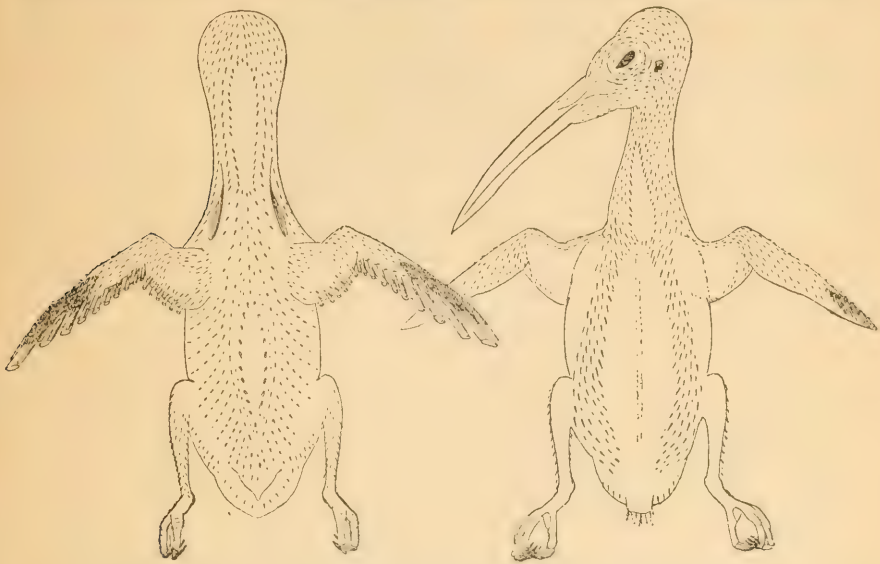


FIG. 1.—The above illustration shows the dorsal and ventral aspects of the pterylosis of a Humming Bird (*Florisuga mellivora*). A small triangular space on the crown of the head is not seen. (Natural size.)

birds save water-fowl, is mainly to allow the warmth of the body to be directly applied to the eggs during incubation, and in birds like ducks and penguins, which are densely or completely feathered beneath, a bare spot is present during the breeding season.

Skeleton.—The most obvious features in the skeleton of a Humming Bird are the width of the front portion of the skull, long neck, short wing, and, above all, disproportionately large breastbone.

The arrangement of the bones of the palate is of the kind termed schizognathous,* and, while the skull in general shows but little to indicate relationship with other groups of birds, the base of the cranium is very Swiftlike and the palate and frontal region have some slight leanings toward the Woodpeckers.

The length of the neck may be best appreciated by saying that in Humming Birds the neck forms four-sevenths of the vertebral column, while among Swallows it forms but three-sevenths, the number of vertebræ being the same—fourteen—in each case.

Following the neck vertebræ are three free dorsal vertebræ and these are succeeded by a "sacrum" of twelve fused vertebræ, the vertebral column being terminated by six caudals.

There are eight pairs of ribs, this being an unusually large number among birds, and especially among land birds, where the ordinary number is six pairs. The first three pairs of ribs join the three free dorsals, the succeeding four pairs are attached

*The description here given of the skeleton is based on *Trochilus colubris*, and while this species agrees in all save very minute points with other species examined, it is to be expected that when more is known of the osteology of the Trochilidæ skeletal differences will be found to exist in the group.

to the first four vertebrae of the "sacral" series, while the eighth and last pair is entirely free at the upper end. The last ribs almost meet the long, slender, down-curved pubic portion of the pelvis, securely hooping in the viscera and giving an unusual air of strength to the skeleton.

The bones supporting the tail are provided with long recurved processes to furnish ample attachment for the well-developed caudal muscles, for the tail forms an important adjunct to the wings when the Humming Bird hangs poised in the air, extracting the honey from some flower.

The shortness of the wing is due to the shortened humerus, radius, and ulna, the remainder of the wing bones being rather long.

The coracoid, the bone to which the wing is hinged, has a very peculiar form among Humming Birds. In the large majority of birds, the tendon running from the muscles that raise the wing plays in a notch in the upper end of the coracoid, but in the Humming Bird this notch is bridged over and the tendon plays securely through the perforation thus formed.



FIG. 2.—The above figure of the shoulder-girdle and attached portion of the skeleton of a Humming Bird (*Selasphorus platycercus*), seen from below, shows the coracoid with its perforations, and the extremely long bones of the hand, the figure being twice the natural size.

The legs seem small, but in reality are proportionately larger than in many other birds, the sharp, curved claws in particular being decidedly well developed.

Skeletal affinities.—In the number of ribs the Humming Birds are approached, but not equaled, by some Swifts, both groups agreeing in the incomplete character of the last pair when more than six pairs are present in any Swift.

The wing of the Humming Bird is largely unique in character and in minor points is intermediate between the Swifts and Passeres.

The manner in which the coracoid joins the sternum—by a shallow cup-and-ball joint—is peculiar to Swifts and Hummers.

In the character of the sternum and the manner in which the ribs are attached to its sides the two groups are nearly alike, while the posterior limbs of both agree in many particulars.

Generalizations.—Skeletal modifications are of two kinds, technically termed morphological and physiological, the former depending on the relationships of the animal the latter on its habits.

In order to better understand the skeleton of the Humming Bird, the form of the feathered wing and mode of its flight should continually be borne in mind, for the Humming Bird is emphatically a bird of the air, and all its parts are modified accordingly.

The external wing is characterized by the great development of the primaries and almost complete functional suppression of the secondaries, while the wing beats are frequent and all movements of the bird sudden. Just how rapid the wing beats are must for the present be merely a matter of conjecture, but it can be said that the

Gannet, a bird of moderately slow stroke, makes ordinarily one hundred and fifty strokes a minute, and that judging from the appearance of a small wheel driven at the rate of a thousand revolutions a minute the wings of a Humming Bird make not far from five hundred vibrations in the same short space of time.

So great an exercise of muscular power as that involved in such rapid movements necessarily causes rapid waste of tissue and calls for an ample supply of blood, and we find that this is provided for by a remarkable large heart.*

The actual speed of the Humming Bird is less than the ordinary observer might suspect, for the small size of the creature adds to the seeming rapidity of its flight, just as the little puffing tug appears to move faster than the ferryboat, although it really does not do so.

The wing and flight of a Humming Bird are comparable to the wing and flight of a fly, or, better still, a Hawk Moth, both possessing a rigid wing driven at a high rate of speed, and both possessing the ability to hang suspended in the air or to dart erratically about in a manner that defies the eye to follow.

Rapidity in the stroke of the wing is gained by shortening the upper arm bones, the bones of the hand on the contrary being lengthened to support the shafts of the large primaries. The inner portion of the wing is furthermore shortened, and speed consequently gained, by flexing the forearm, and examination of a bird in the flesh will show that it is quite impossible for a Humming Bird to extend its wings as do other birds.

The wing of a bird is a lever of the third order, and since the power is applied at a disadvantage, any increase of speed calls for corresponding increase in driving power, which in a bird means larger pectoral muscles and a larger breastbone. Now the sternum of a Humming Bird is, relatively to the size of the bird, by far the largest in the entire class of birds, and although the proportion of length to depth of keel is equaled in some Swifts, it must be remembered that the sternum of a Humming Bird is not only deep, but long, running nearly the entire length of the body. The increased size of the pectoral muscles not only adds to the power of flight, but to the stability of the bird, for the weight, like the ballast of a cutter yacht, is thus brought low down.

All attachments to the wing muscles are large, and when the humerus is magnified to the size of that of a Swift it is seen to be the more rugose of the two. At first sight the breastbone might appear too thin to resist the strain of the muscles it supports, but these being arranged in pairs pull as it were one against the other, thus relieving the sternum of the strain that would otherwise be brought upon it.

In short, the Humming Bird is a piece of mechanism most admirably adapted for flight, and wonderful as are the modifications of plumage in various members of the group, no less remarkable is the adaptation of the skeleton for the most rapid and remarkable aerial maneuvers.

Description of the tongue.—The tongue of the Humming Bird, like that of the Woodpecker, is extremely long, but the two differ decidedly in their structure, and the muscles by which the tongue is protruded and retracted are applied in a totally different manner in the two birds.

The free portion of the tongue is divided for about half its length, and when withdrawn lies just within the lower mandible. Toward the base it consists of a somewhat flattened tube of dense cartilage, grooved along the center above and below, and with a slighter groove on the upper exterior surface. This single tube divides before reaching the forked part of the tongue, and a flange is developed along the outer edge. This flange, or border, becomes membranous, and seems to curl upward and inward, converting the forked tip into two tubes or gutters. That these

* According to Mr. G. Gulliver (in Proceedings of the Zoölogical Society of London, 1846, p. 28), the blood-corpuscles of a Humming Bird (species not stated) measure $\frac{1}{2600}$ by $\frac{1}{4000}$ of an inch, the long diameter of the nucleus being very nearly $\frac{1}{4000}$ of an inch; the temperature of the blood about 105°.—R. R.

serve for the passage of nectar from flowers seems a little doubtful, the peculiar modification of the tongue probably being for the capture of minute insects. The anterior half of this membranous flange is more or less fringed, as noted by Gosse and

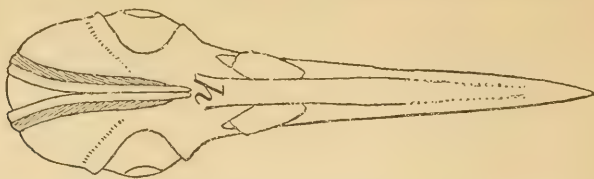


FIG. 3. The accompanying figure of the head of a Humming Bird (*Eulampis holosericeus*), seen from above, shows the termination of the hyoid, or tongue, bones *h*. The shaded bands indicate the muscles which retract the tongue. (The figure is twice the natural size.)

others, but how much of this fimbriation is normal and how much is due to the whipping out of the membrane by use is not quite evident. That some of the fimbriation is due to wear is certain from its appearance under the microscope.

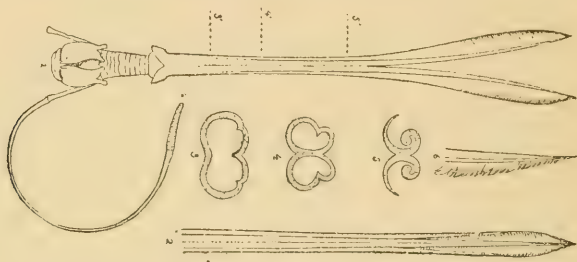


FIG. 4. The accompanying figures, showing details in the structure of the tongue of a Humming Bird (*Eulampis holosericeus*), may be described as follows:

No. 1 shows the tongue, twice the natural size, with the free portions separated and the membrane spread out.

No. 2 shows the anterior portion of the tongue, greatly enlarged, with the membranous fringe curled up, as in life.

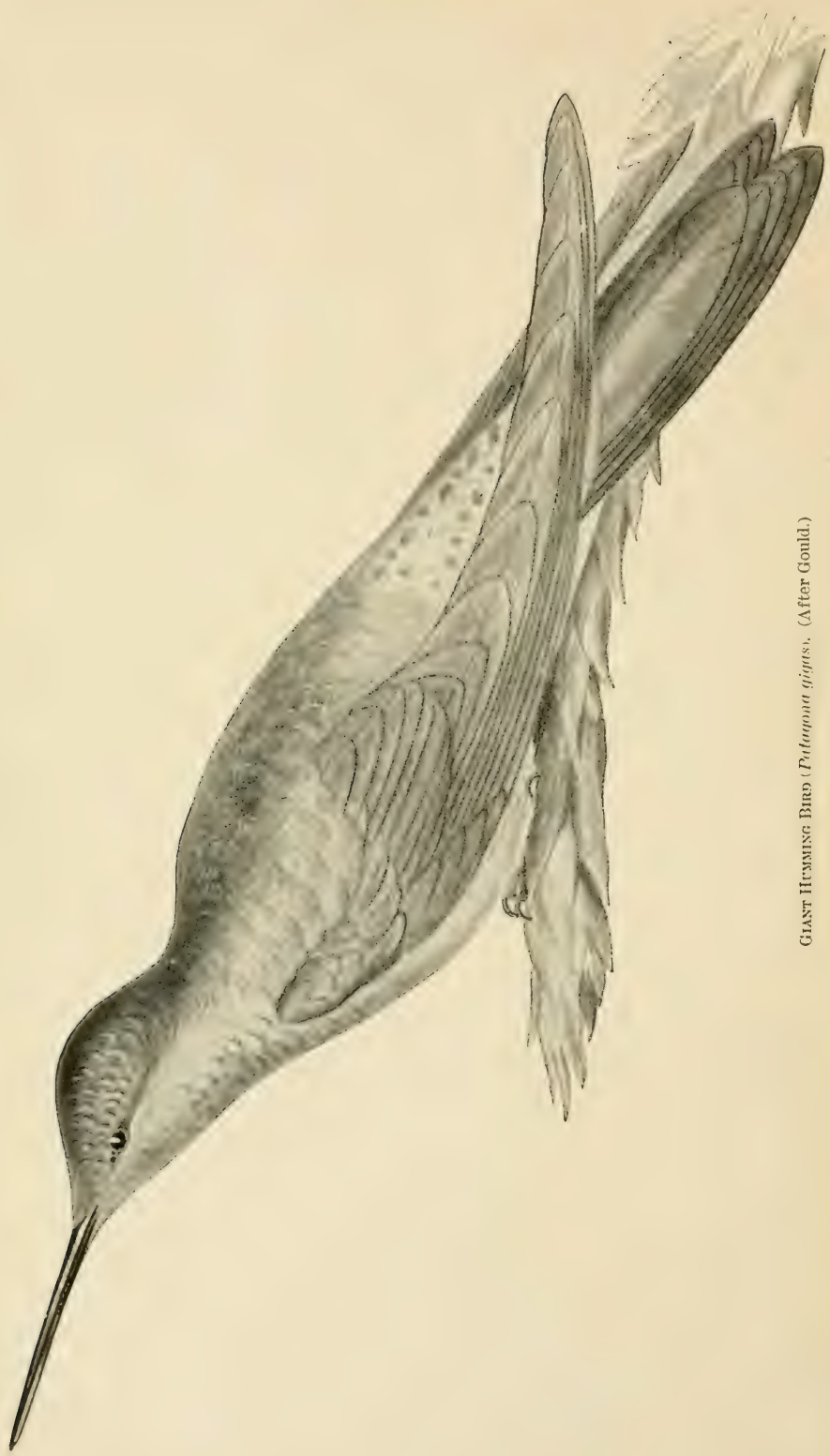
Nos. 3, 4, and 5 are sections through the tongue at 3', 4', and 5', greatly enlarged.

No. 6 represents the termination of one of the free portions of the tongue very much enlarged.

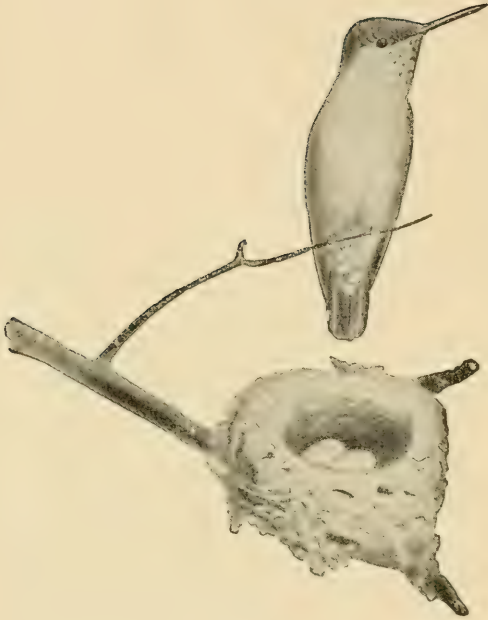
VARIATIONS.

The range of variation in the details of form or external structure, size, and coloration in the Humming Birds is very great—perhaps more so than in any other group of coördinate rank among birds, this variation affecting chiefly the bill, as to its proportionate length and whether straight or curved, and if curved to what degree and in what direction; the tail (which, however, always consists of ten rectrices?)*, in the relative length of different feathers, one or more pairs of which are sometimes singularly or even extraordinarily developed or aborted; and the wing, as to the shape of the outer primary and the thickness of its shaft. These variations are so complex, however, that it will be best to treat of them under distinct headings. Indeed “it is the great diversity of form in this family of birds,” says Mr. Gould, “which renders the study of them so very interesting. If these little objects were

* See remarks as to this on page 300.



GIANT HUMMING BIRD (*Patagona gigas*). (After Gould.)



VERVAIN HUMMING BIRD (*Mellisuga minima*).

Male. (Cat. No. 30274, U. S. N. M. Jamaica. Collected by W. T. March.)

Nest and eggs. (Cat. No. 8426, U. S. N. M. Jamaica. Collected by W. T. March.)

magnified to the size of eagles, their structural differences would stand out in very bold relief, and the many marked generic distinctions they present would be far more clearly perceptible."

Variations in size.—The variation in size, while very considerable, is not greater than in some other groups of birds, as, for instance, the diurnal birds of prey and the crow family. While as a family, or group, the Humming Birds are the smallest of birds, many kinds are considerably larger than the smallest Passerine birds, as the Kinglets, Creepers, and smaller Wrens; while, owing to their shorter, more scale-like feathering, and greater compactness of body, many Humming Birds far exceed in actual bulk and weight the above-mentioned members of the Oscinine Sub-Order.

The giant of Humming Birds is the *Patagona gigas*, a plainly colored species inhabiting the higher portions of the Andes range (from Chile to Ecuador), which in bulk equals a good-sized Swift, being about 8½ inches in length, with the wing 5 inches or more and the tail nearly 4 inches. The smallest known species is Princess Helena's Humming Bird (*Calypte helenæ*, GOULD), of Cuba, the entire bulk of which is much less than the head alone of the Giant Hummer, the total length being only about 2¼ inches. The distinction of being the smallest among birds has usually been accorded to the Vervain Humming Bird (*Mellisuga minima*), of Jamaica, but that it is considerably larger than the Cuban *Calypte*, the following comparative measurements will show:

	Wing.	Tail.	Exposed culmen.
<i>Calypte helenæ</i> , male.....	1.10-1.15	0.65	0.40
<i>Mellisuga minima</i> , male	1.40-1.48	0.82-0.85	0.38-0.40

We are fortunately able to show, in the accompanying plates, full-length, natural-size drawings of the Giant and Vervain Hummers, the latter with its nest and eggs.*

The nest of the Vervain Humming Bird measures only about three-fourths of an inch in diameter across the cavity, and a little more than an inch in total diameter, while the eggs are only about 0.28 of an inch in length by 0.20 of an inch in width.

The accompanying illustration shows the male and the nest and eggs of this species, natural size.

Variations of the bill.—The extremes of length in this member are represented in the genera *Docimastes* and *Rhamphomieron*, in both of which it is straight. In the former it exceeds in length the combined length of the head, neck, body, and tail of the bird itself, being sometimes as much as 4½ (or according to Mr. Gould, sometimes more than 5) inches in extent. In the smallest species of the latter genus, *R.*

* The discovery that *Calypte helenæ* is smaller than *M. minima* was not made until after the drawing of the latter was completed.

microrhynchum, it is only a quarter of an inch in length. "The bill of *D. ensifer*, which is more than 5 inches long, and which contains a tongue capable of being protruded nearly as far beyond its tip, is most admirably fitted for the exploration of the lengthened and pendent corollas of the *Brugmansia*, while the short-billed *Lesbia* cling to the upper portion of those flowers, pierce their bases, and with the delicate feelers at the extremities of the tongue, readily secure the insects which there abound."

In the various genera there is every gradation from a perfectly straight bill to one that is decidedly curved or arched; but in one genus (*Eutoxeres*) it is so greatly decurved as to constitute almost one-third of a circle, thus justifying the very appropriate name of Sicklebilled Hummers, by which the birds of this genus are known. This variation in the length and shape of the bill, it may be remarked, is necessitated by some peculiarity of the flower in which, chiefly or exclusively, the bird seeks its food. For example, the excessively lengthened beak of the "sword bearer" (*Docimastes*), as explained above, is necessary for reaching the honey-glands of very long trumpet-shaped blossoms, while the hook-like beak of the "sickle bill" is evidently designed for insertion into the curved throat of certain orchids, palms, or other flowers of unusual form.

The manner in which the Sicklebilled Humming Bird feeds is thus described by Dr. J. King Merritt in the *Annals of the Lyceum of Natural History of New York*, vol. 6, p. 139:

One day, while out hunting a short distance from camp, I was startled by the swift approach of a small object through the dense thicket, which darted like a rifle-bullet past me, with a loud hum and buzzing of the wings. Indeed it was this great noise that accompanied its flight that especially attracted my attention as something uncommon.

The bird continued its flight but a short distance beyond the spot where I stood, when it suddenly stopped in its rapid course directly in front of a flower. There for a moment poising itself in this position it darted upon the flower in a peculiar manner; in fact, the movements which now followed were exceedingly curious. Instead of inserting its beak in the calyx by advancing in a direct line toward the flower, as customary with this class of birds, this one performed a curvilinear movement, at first stooping forward while it introduced its beak into the calyx, and then, when apparently the point of the beak had reached the desired locality in the flower, its body suddenly dropped downwards, so that it seemed as though it was suspended from the flower by the beak. That this was not actually the case the continued rapid movement of its wings demonstrated beyond a doubt. In this position it remained the

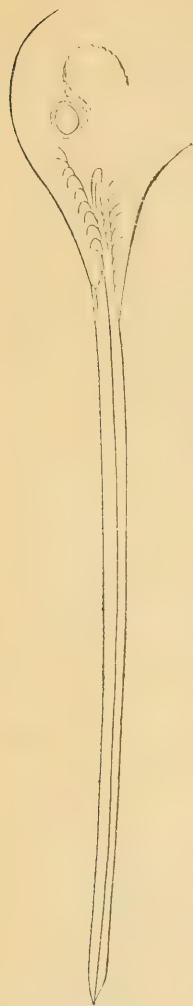


FIG. 5.—Head of *Docimastes ensiferus*.



FIG. 6.—Head of *Rhamphocyon microrhynchum*.

ordinary length of time, and then, by performing these movements in the reverse order and direction, it freed itself from the flower, and afterwards proceeded to the adjoining one, when the same operation was repeated as already described.



FIG. 7.—Bill of *Eutoxeres aquila*.



FIG. 8.—Bill of *Heliotrypha exortis*.



FIG. 9.—Bill of *Avocettula recurvirostris*.

The flower resembles somewhat in form the Roman helmet inverted, and is attached, as it were, by the point of the crest to the stalk.

Regarding the recurved bill of *Avocettula*, the use for which it is adapted is thus conjectured by Mr. Swainson :

The extraordinary formation in the bill of this beautiful little creature, is without parallel in any land bird yet described, and presents in miniature a striking resemblance to that of the avocet. It is almost impossible to conjecture rightly the use of this singular formation ; but it appears to me not improbable, that the principal sustenance of the bird may be drawn from the pendent bignonaceæ, and other similar plants, so common in South America, whose corollæ are long, and generally bent in their tube ; the nectar being at the bottom, could not be reached either by a straight or a curved bill, though very easily by one corresponding to the shape of the flower.

Another distinct type of bill is the wedge-shaped, seen in the genera *Heliothrix* and *Schistes*, in which the terminal portion (almost the terminal half in *Heliothrix*) is very much compressed, the tip, when viewed from above, forming the finest possible point, as shown below :



FIG. 10.—Bill of *Heliothrix auritus*, showing the extremely compressed tip, a being a vertical view.



FIG. 11.—Bill of *Schistes personatus*.

Some genera which, instead of extracting their food from flowers, feed upon spiders and other insects, while hovering in the usual manner, which they snatch from the under surface of leaves or from the branches of trees, have the tip of the bill hooked, and the edge of the mandible finely toothed or fringed near the tip, the better to secure their prey.

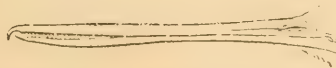


FIG. 12.—Bill of *Androdon æquatorialis*.

The nostrils are situated at the base of the upper mandible, on each side, and are overhung by a distinct scale or operculum. Sometimes this latter is wholly uncovered, and is then very conspicuous ; but oftener it is entirely bidden by short imbricated feathers, entirely con-

cealing the nostrils or else permitting them to be seen only as a narrow slit beneath the lower edge of the feathering.



FIG. 13.—Head of *Hylocharis sapphirina*, showing naked nostrils, with overhanging membrane.



FIG. 14.—Head of *Eugenia imperatrix*, showing dense feathering over nostrils.

Variations in the form of the wing.—As already stated (see page 289), the first primary is invariably the longest, except in two genera, *Aithurus*, in which it is decidedly shorter than the second, and *Atthis*, in which the first and second are about the same length.

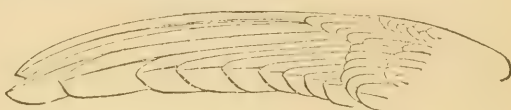


FIG. 15.—Wing *Aithurus polytmus*.



FIG. 16.—Wing of *Hylonympha macrocerca*.

Usually, the outer primary is not different in shape from the second; but occasionally it is quite different, as in the genera *Lafresnaya* and *Agelactis*, in which it is very narrow for the entire length, the tip



FIG. 17.—Wing of *Atthis ellioti*.



FIG. 18.—Primaries of *Selasphorus platycerus*. (Under side showing peculiar form of first and second quills.)

curved inward or upward; and in certain species of *Selasphorus*, in which the tip is contracted and curved outward, as shown in the accompanying diagrams:



FIG. 19.—Wing of *Lafresnaya flavicaudata*.



FIG. 20.—Wing of *Aglæactis cupreipennis*. (Under side, showing very narrow outer quill.)

Ordinarily, there is a regular gradation in the size and shape from the first to the tenth primary; but sometimes this is not the case, the



FIG. 21.—Wing of *Trochilus colubris*, adult male.

male of the common Ruby-throated Humming Bird (*Trochilus colubris*) affording a conspicuous example. In this, the six innermost quills are

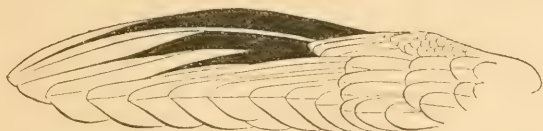


FIG. 22.—Wing of *Sphenoproctus pampa*, to show excessively thickened shafts of three outer primaries.

not only abruptly much smaller than the others, but they are quite differently shaped at their tips (see Fig. 21).



FIG. 23.—Wing of *Eupetomena macroura*.

Although the shafts of the primaries are always hard and strong, to enable them to endure the rapid vibrations to which they are subjected during flight, they are not often conspicuous for their unusual thick-

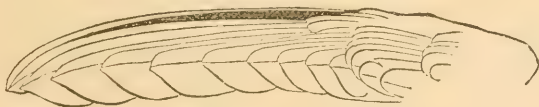


FIG. 24.—Wing of *Aphantochroa cirrhochloris*.

ness. In some genera, however, they are thus extraordinarily developed, in *Sphenoproctus* and some species of *Campylopterus*, for example, appearing almost like a monstrosity or abnormal swelling, as shown



FIG. 25.—Outer primary of a species of *Campylopterus*, showing thickened shaft.

in (Figs. 22 and 25), which is accompanied by others (Figs. 23 and 24) to show the gradual transition through which this excessive development is reached.

Variations in the form of the tail.—The number of tail-feathers is usually, perhaps always, ten. One species, the Marvellous Humming Bird (*Loddigesia mirabilis*), is said to possess only four; but, although I have not seen the bird in question, I can not help thinking that the apparently absent rectrices are aborted and confounded with the coverts.* Certainly in at least one other genus (*Myrtis*), such an abortion of the middle pair of tail-feathers is very evident, these being so much reduced in size as to be entirely concealed by the upper tail-coverts.† On the other hand, another genus (*Florisuga*) seems to possess twelve tail-feathers; but a close examination will show that what are apparently the middle pair of rectrices are in reality the two longest upper tail-coverts.

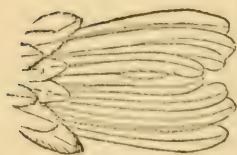


FIG. 26.—Tail of *Myrtis fanny*, showing aborted middle rectrices (x x), the upper tail-coverts being parted to expose them to view.

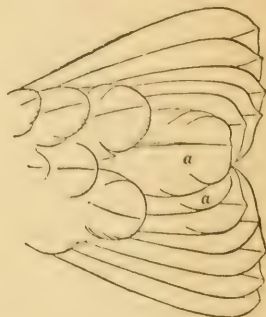


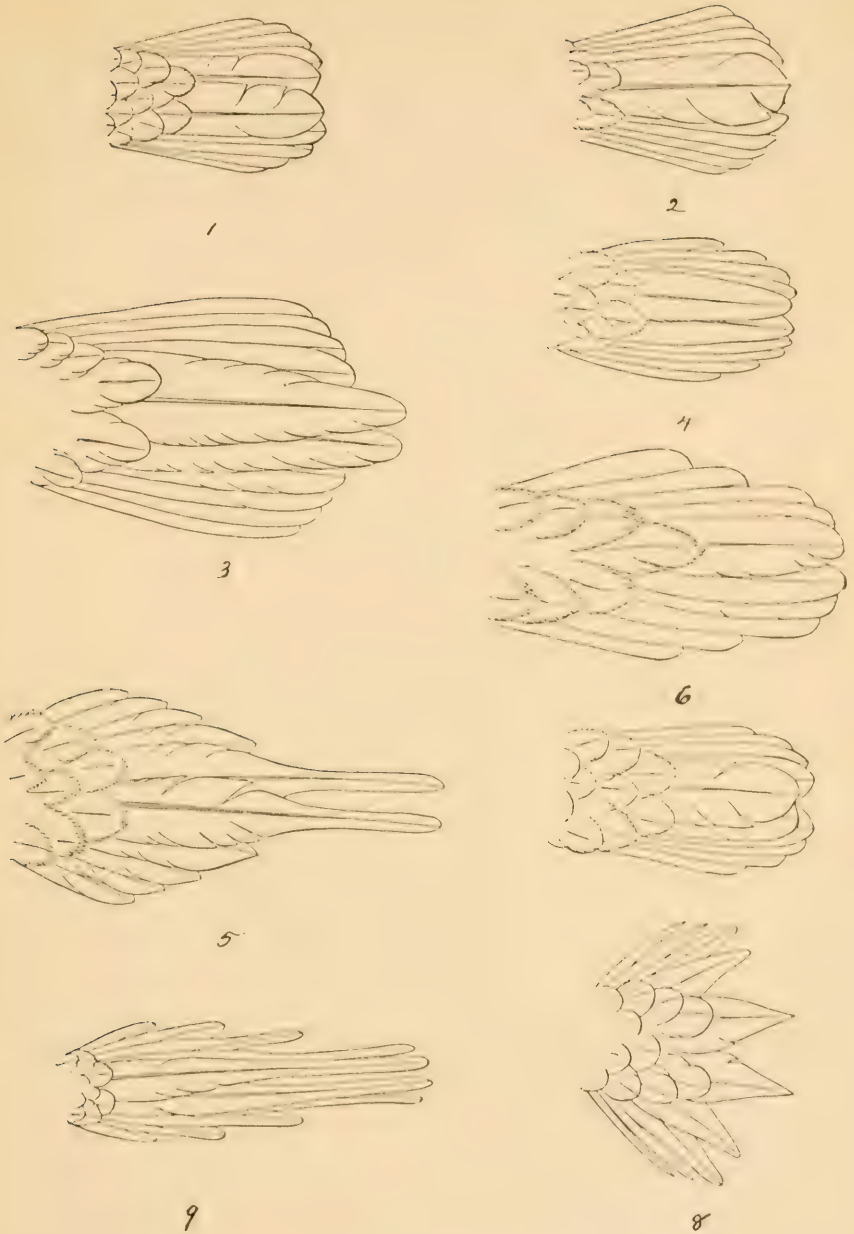
FIG. 27.—Tail of *Florisuga mellivora*, showing specialized pair of upper coverts (a a).

The shape and development of the tail-feathers in the Humming Birds vary to a degree that has no parallel among other birds, many of the forms assumed being also entirely unique. Much the larger number of species have the tail of a shape not very different from the ordinary types among birds, that is to say, moderately rounded or forked, or nearly even; but besides tails of a normal shape there are deeply forked or forficulate (scissors shaped) tails, graduated or wedge-shaped tails, double-rounded and double-emarginated tails, tails with streamers, tails with racket- or paddle-shaped feathers, and tails whose shape can not be designated by any special term. Putting aside those which depart least from the ordinary shapes, the different types, with their variations, are illustrated by the figures composing Plates XVIII–XXIV.

Variations in development of the tail-coverts.—Excepting the case of *Florisuga*, referred to above, there are few notable modifications of the tail-coverts. Two genera, however, may be mentioned which have these feathers conspicuously developed, the one as to size, the other as to

* In *Acestrura micrura*, according to Mr. Gould, all the rectrices are thus aborted, the entire tail being concealed by the coverts.

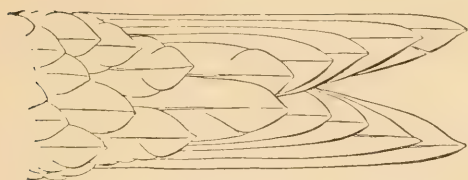
† Gould also cites as examples *Thaumastura cora* and *Doricha enicura*; but in these species the middle pair of rectrices while very short are not wholly hidden by the coverts, as is the case in *Myrtis fanny*. (See Plate XXIV, Fig. 1, and Plate XXII, Fig. 1).



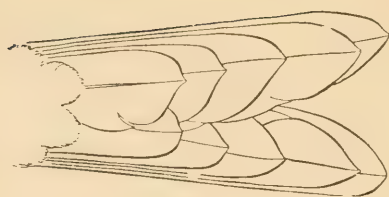
OUTLINES OF TAILS OF HUMMING BIRDS.

- Fig. 1. *Phlogophilus hemileucurus*.
 Fig. 2. *Schistes geoffroyi*.
 Fig. 3. *Sphenoproctus pampa*.
 Fig. 4. *Juliamyia julie*.
 Fig. 5. *Phaethornis superciliosus*.

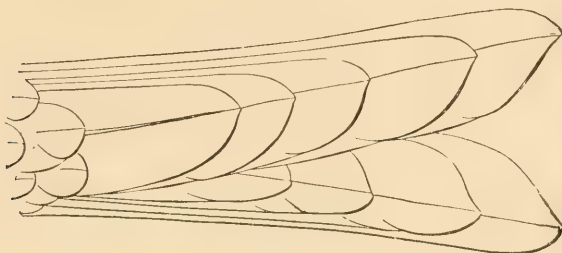
- Fig. 6. *Heliothrix auritus*.
 Fig. 7. *Leucochloris albicollis*.
 Fig. 8. *Scelasphorus ulleni*.
 Fig. 9. *Heliactin cornuta*.



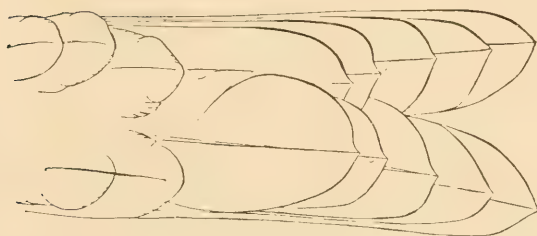
1



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6

OUTLINES OF TAILS OF HUMMING BIRDS.

Fig. 1. *Docimastes ensiferus*.

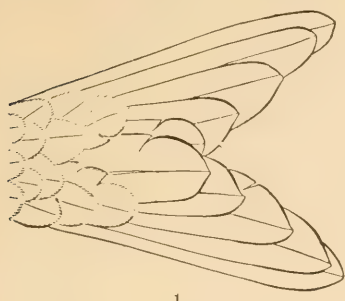
Fig. 2. *Heliodoxa jacula*.

Fig. 3. *Oreonympha nobilis*.

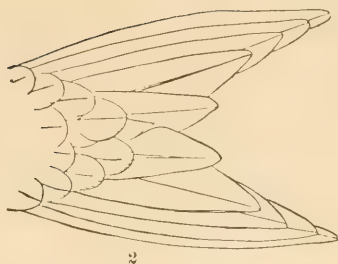
Fig. 4. *Pterophanes temmincki*.

Fig. 5. *Helianthea typica*.

Fig. 6. *Oreotrochilus pichincha*.



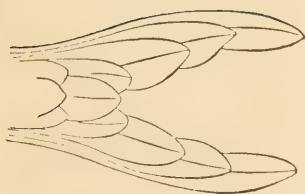
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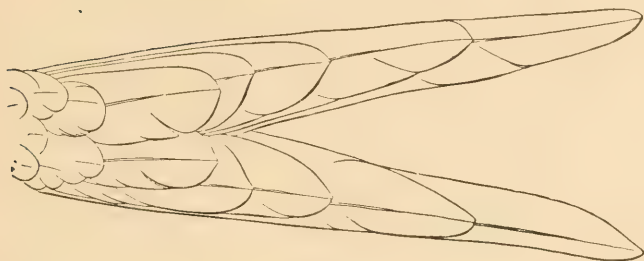
OUTLINES OF TAILS OF HUMMING BIRDS.

- Fig. 1. *Sporadinus elegans*.
 Fig. 2. *Helimaster furcifer*.
 Fig. 3. *Popelairia langsdörfi*.
 Fig. 4. *Ptochoptera iolæma*.

- Fig. 5. *Tilmatura duponti*.
 Fig. 6. *Rhodopsis vesper*.
 Fig. 7. *Popelairia conversi*.



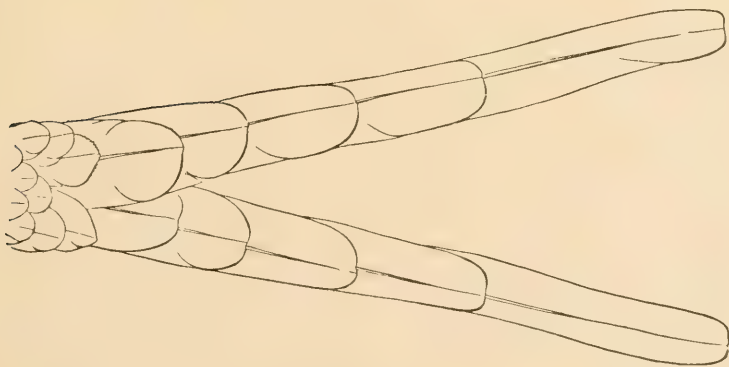
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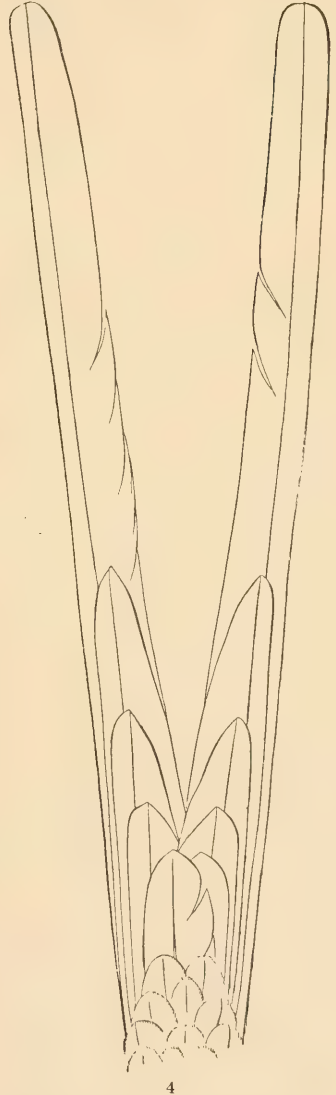
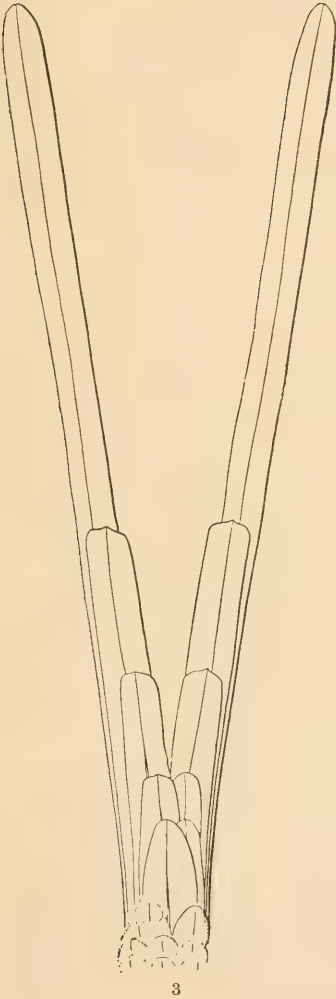
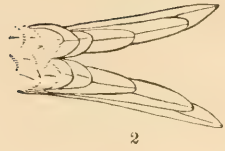
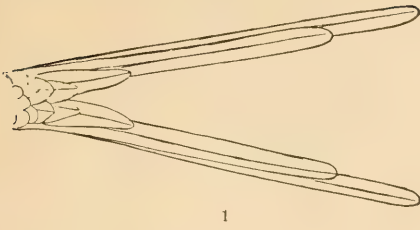
OUTLINES OF TAILS OF HUMMING BIRDS.

Fig. 1. *Eugenia imperatrix*.

Fig. 2. *Eupetomena macroura*.

Fig. 3. *Hylonympha macrocerca*.

Fig. 4. *Sappho sparganura*.



OUTLINES OF TAILS OF HUMMING BIRDS.

Fig. 1. *Doricha enicura*.

Fig. 2. *Calliphlox amethystina*.

Fig. 3. *Lesbia nuna*.

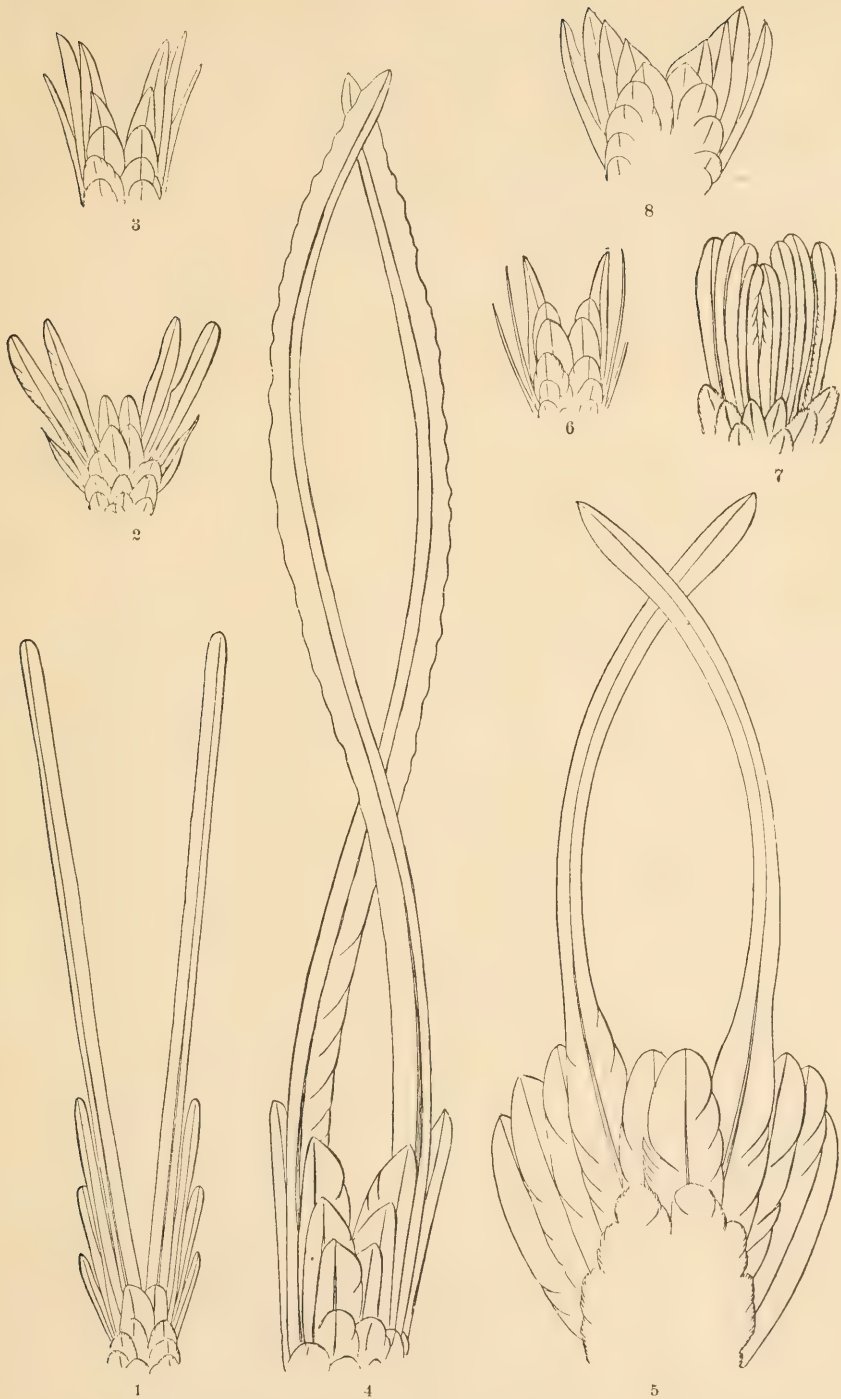
Fig. 4. *Cyanolesbia forficata*.



Fig. 3. *Discosura longicauda*.

OUTLINES OF TAILS OF HUMMING BIRDS.
Fig. 2. *Loddigesia mirabilis*.

Fig. 1. *Steganura underwoodi*.



OUTLINES OF TAILS OF HUMMING BIRDS.

- Fig. 1. *Thaumastura cora*.
 Fig. 2. *Chætocercus jourdani*.
 Fig. 3. *Calothorax lucifer*.
 Fig. 4. *Aithurus polytmus*.

- Fig. 5. *Topaza pella*.
 Fig. 6. *Acestrura mulsanti*.
 Fig. 7. *Myrtis fanny*.
 Fig. 8. *Trochilus colubris*.

form. These are *Eulampis*, in the species of which the upper tail-coverts are large, broad, and rounded, covering more than half of the

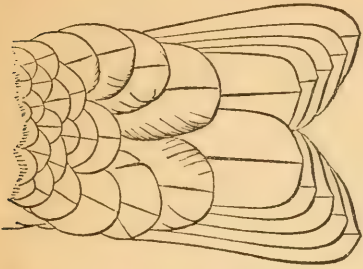


FIG. 28.—Tail of *Eulampis jugularis*, showing enlarged upper coverts.



FIG. 29.—Tail of *Chalybura buffoni*, showing plume-like under coverts.

tail and very brilliantly colored, and *Chalybura*, in which the under tail-coverts have very downy and decomposed webs, thus somewhat resembling miniature ostrich plumes.

HEAD ORNAMENTS, ETC.

Of all birds only the Birds of Paradise can rival the Humming Birds in the extraordinary development of portions of their feathering. Unusual developments of the tail have already been described (see page 300), as have also occasional modifications of the tail-coverts; but there remains to be specially mentioned the various kinds of head ornaments with which the males of many species are adorned. The most frequent head ornament of the Humming Birds is a "gorget" or patch of imbricated feathers covering the throat of the male, the color of which is usually brilliantly metallic and very different from that of other portions of the bird's plumage. This gorget is well shown in the male of the common Ruby-throated Humming Bird (*Trochilus colubris*), in which the feathers on the sides of the throat are only slightly elongated. In other genera (as for example *Myrtis*) these feathers are of uniform length, while in others, notably *Calothorax* and *Acestrura* and some species of *Scelasphorus* and *Calypte*, the lateral feathers of the gorget are greatly elongated, forming a conspicuous ruff on each side of the throat, as shown in figures 32–36. In the genus *Stellula* the feathers of the ruff, instead of being rounded and scale-like, are narrow and lengthened—almost lanceolate—the individuality of each one being strengthened by the peculiar coloration, the tips being metallic purple and the basal portion snow-white. (See Fig. 35.)

Of all the gorgeted Humming Birds by far the finest are the two species of the genus *Calypte* which inhabit parts of Mexico and California and the single one found in Cuba. In these birds not only is the gorget, with its elongated lateral extensions, but the whole top of the head also, of the most brilliant imaginable metallic red or violet (accord-

ing to the species); indeed, as Mr. Gould truly says, these birds "are unequaled for the rich metallic brilliancy of certain parts of their



FIG. 32.—Head of *Calothorax lucifer*, ♂.



FIG. 33.—Head of *Trochilus colubris*, ♂.



FIG. 34.—Head of *Myrtis fanny*, ♂.

plumage by any other members of the family," the color of the head and ruffs being "as glitteringly resplendent as if they had been dipped in molten metal."



FIG. 35.—Head of *Stellula calliope*, ♂.



FIG. 36.—Head of *Calyppte anna*, ♂.

In all the gorgeted Humming Birds except the genera *Atthis* and *Tilmatura* the males have the tail either plain purplish dusky or else varied only with rufous (as in the species of *Selasphorus*), the middle pair of feathers, however, usually shining green, like the back. The females all have the tail not only different in form but also totally different in coloration; the feathers, except the middle pair (sometimes two middle pairs), having a white tip, preceded by a subterminal band or space of blackish, the basal portion being green or rufous. This type of coloration, however, characterizes both sexes in the genus *Atthis*, which otherwise appears closely related to the genera *Trochilus*, *Selasphorus*, and *Calyppte*. In *Tilmatura* the tail feathers are strikingly marked with alternate patches of black, white, and rufous.

Other genera have instead of the typical humming-bird gorget a beard-like tuft depending from the middle of the throat, and usually very brilliantly metallic in coloration. The extreme forms which this beard-like tuft assume are shown by the accompanying figures.

The fantastic markings, towering crests, and lengthened beards of the species of *Orypogon*, says Mr. Gould, render these birds very conspicuous objects notwithstanding their plain coloration.

Crests are comparatively uncommon among the Humming Birds, only nine of the more than one hundred genera containing species which are



WHITE-BOOTED RACKET-TAIL (*Steganura underwoodi*). (After Gould.)

crested. These are *Aithurus*, *Heliactin*, and *Chrysolampis*, of one species each; *Polemistria* and *Cephallepis*, of two species each; *Bellona*,

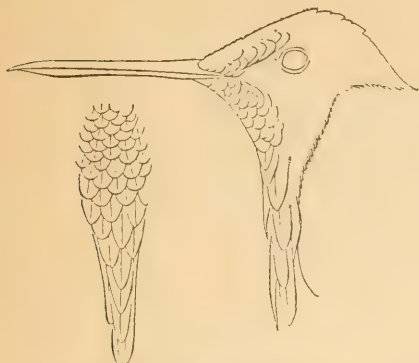


FIG. 37.—*Orconympha nobilis*.



FIG. 38.—*Orypogon lindeni*.

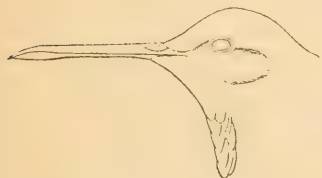


FIG. 39.—*Augastes lumachellus*.



FIG. 40.—*Urosticte benjamini*.

with two or three; *Orypogon*, consisting of three species, and *Lophornis* and *Popelairia*, each with several species, but only a part of them furnished with crests. Altogether there are only about twenty of the five hundred species, or a little more than 4 per cent. of the whole number, that are crested, or only about one to every five species the males of which possess a metallic gorget.*

Aithurus and *Heliactin* possess a double crest springing from each side of the hinder crown or occiput. In the two genera, however, these ornaments are quite different in form, as may be seen by the accompanying cuts (Figs. 41, 42), and still more so in their coloration, those of *Aithurus* being deep, velvety black while those of *Heliactin* are of the most brilliant possible metallic gold, changing to fiery scarlet or crimson towards the bases of the feathers.

The closely related genera *Chrysolampis* and *Bellona* have intensely brilliant crests covering the whole top of the head of very sharply outlined, imbricated feathers, the more posterior of which are considerably elongated, forming a pointed crest in the latter and a rounded one

* Metallic throat-spots which do not cover the whole throat are not counted as gorgets in this estimate.

in the former, which in addition possesses a brilliantly metallic gorget of imbricated or scale-like feathers, the throat of *Bellona* being clothed



FIG. 41.—Double crest of *Aithya polytmus*.



FIG. 42.—Double crest of *Heliactin cornuta*.

with a blended and somber colored plumage. In *Bellona* the crest is glittering green, sometimes passing into blue at the tip, or even for the terminal half; in *Chrysolampis* the crest is ruby-red, the throat golden-orange or topaz.



FIG. 43.—Vertical view of crest of *Chrysolampis moschitus*, ♂.



FIG. 44.—Vertical view of crest of *Bellona cristata*, ♂.

The genus *Cephallepis* has a much lengthened, narrow, pointed, and slightly recurved crest, closely resembling that of the Lapwing Plover (*Vanellus vanellus*). That of *Oxyphaps* (see Fig. 38, p. 303) is somewhat similar. All of the species of the genus *Lophornis*, embracing the ex-



FIG. 45.—*Cephallepis delalandi*, ♂.



FIG. 46.—*Lophornis ornatus*, ♂.

quisitely ornamented, bespangled, frilled, and otherwise decorated "Coquette" Humming Birds possess crests in addition to their other ornaments, which vary in their character with the species; but here the subject becomes so intricate that to pursue it further would require far more space than can here be afforded, besides perhaps proving tiresome to the reader. The subject should not be dismissed, however, without calling attention to a very elegant adornment of several genera in the shape of "muffs" or "puffs" of the most delicate possible cottony down clothing the legs and almost hiding the dainty feet. These

puffs are usually white, but sometimes brown, or more rarely black, and are most conspicuously developed in the genera *Panoplit*es, *Eriocnemis*, and *Steganura*.



FIG. 30.—Leg puffs of *Panoplit*es
flavescens.



FIG. 31.—Short tarsal feathers of *Heliodoxa*
jacula.

COLORS OF THE PLUMAGE.

When morning dawns, * * * * *
The flower-fed Humming Bird his round pursues ;
Sips with inserted tube the honied blooms,
And chirps his gratitude as round he roams ;
While richest roses, though in crimson drest,
Shrink from the splendor of his gorgeous breast.
What heavenly tints in mingling radiance fly !
Each rapid movement gives a different dyé ;
Like scales of burnished gold they dazzling show—
Now sink to shade, now like a furnace glow !

—ALEXANDER WILSON.

While their diminutive size is one of the most striking peculiarities of Humming Birds, their beautifully varied or resplendently metallic plumage is, as a rule, not less so.

Reference has been made on previous pages to the luminous gorget of many species, and to the shining crests or beards of others ; but we failed to mention that some kinds, instead of having luminous throats, have the halo of radiance transferred to their crowns, as in species of *Uranomit*ra, in which the color is blue or violet, and *Eusteph*anus, in which it is brilliant red or green, according to the species. Frequently there is a spot of the most brilliant emerald-green on the forehead, immediately above the base of the bill, forming “a star brighter than Venus, the queen of planets” (Gould). It is worthy of remark that this glittering gem-like spot has always a setting of the most intense velvety black, to increase, by contrast, its brilliancy. Usually, but not always, these same Humming Birds have a similar spot on the middle of the throat, its color, however, more often violet than green ; and occasionally there are two brilliant spots on the throat, one below the other, and of a different color, in which case it is interesting to observe, that only one of them reflects its full brilliance at once, it being necessary for the bird (or the person holding it, if a stuffed specimen), to shift its position slightly to bring the other into full view—which, however, is done at the expense of the one previously seen.

In some kinds the area of brilliant coloration lies upon some other part of the bird than the head or throat. In some species of the genus *Eriocnemis*, the amply developed upper tail-coverts are most glitter-

ingly brilliant, while in another genus, *Aglæactis*, the whole rump is metallic, all the rest of the plumage being devoid of luster.

With the exception of the genus last mentioned, Humming Birds show the full brilliancy of their metallic colors only when the plumage is viewed toward the direction in which the feathers lie; * that is, one having a specimen in his hand, must, in order to obtain the richest effect, hold it with the head towards him, the bird itself on the opposite side from which the light comes. Reversing its position relative to himself (but not to the light), the metallic hues disappear or are but faintly discernible. In *Aglæactis*, however, exactly the reverse is the case, the burnished metallic hues of the rump appearing only when viewed *against the ends* of the feathers.†

In more than 99 per cent. of the species of Humming Birds, the color of the primaries is a dull purplish dusky, with very faint metallic luster. So nearly universally, in fact, is this the case, that there appear to be only two conspicuous exceptions, the Sapphire-wing (*Pterophanes temmincki*)—next to *Patagona gigas*, the largest of Humming Birds—in which all the remiges are a brilliant steel-blue, or in a strong light almost a Prussian-blue color, and the Purple Carib (*Eulampis jugularis*), in which their color is lustrous bluish green. In no species of Humming Bird are the primaries parti colored; and when, as is sometimes the case, the secondaries are of more than one color, the additional color is invariably rufous.

On the other hand, brilliantly colored tails are very common, and sometimes the gorgeous coloring of this member is unapproached by that of any other birds. The Comet Humming Birds (genus *Sappho*), for example, have very long and deeply forked tails (see Pl. XXI, Fig. 4), of the most glittering brilliant metallic red, each feather tipped with velvety black. The allied genus *Cyanolestia* has a tail of similar size and shape (Pl. XXII, Fig. 4), but burnished metallic blue or green, instead of red. The genera *Augastes*, *Chrysuronia*, *Metallura*, and *Arocellula* have the brilliant coloration of the tail most conspicuous on the under surface, which is of a splendid golden bronze or red bronze, according to the species. There are also other types of coloration affecting the rectrices, but they are too numerous to particularize in this connection.

* "In such Humming Birds as I have examined," says Gosse (*Birds of Jamaica*, pp. 94, 95), "the iridescence of those portions of the plumage that are changeable, is splendid—in the ratio of the acuteness of the angle formed by the incident ray and the reflected one. Thus the plumes of the neck of the Mango appear to advantage in a room with a single light, only when the beholder stands with his back to the window, and has the bird before him and facing him. Then the perpendicular band down the throat and breast, which seems composed of the richest black velvet, is bounded on each side by a broad band of glowing crimson, mingled with violet."

† The same thing, though to a less degree, is observable in the species of *Lampropygia*, in which, however, the metallic coloring of the rump is much less brilliant.



GUERIN'S HELMET-CREST (*Oxygogon guerini*). (After Gould.)



HERRAN'S THORN-BILL (*Ramphomicron herrani*). (After Gould.)



DE LALAND'S PLOVER-CREST (*Cephallepis delalandi*). (After Gould.)

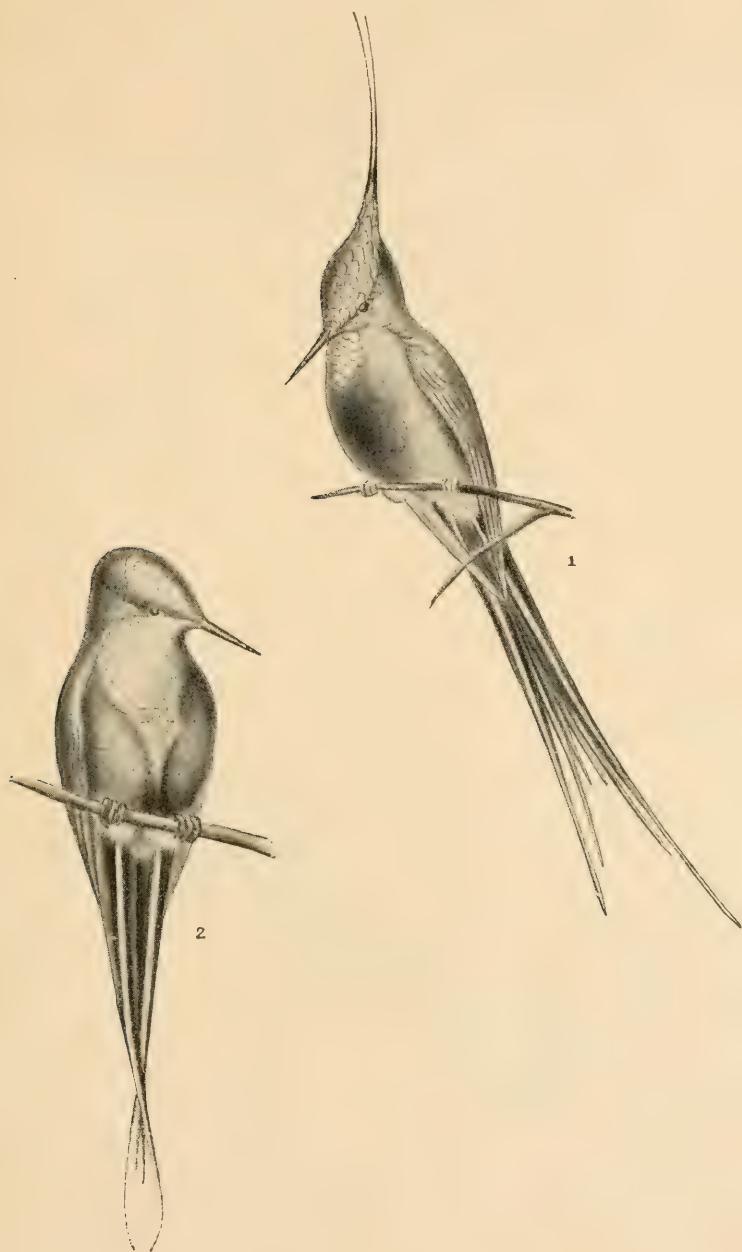


Fig. 1. POPELAIRE'S THORN-TAIL (*Popelairia popelairia*). (After Gould.)
Fig. 2. CONVERS' THORN-TAIL (*Popelairia conversi*). (After Gould.)



Fig. 1. PRINCESS HELENA'S COQUETTE (*Lophornis helenæ*). (After Gould.)

Fig. 2. ADORABLE COQUETTE (*Lophornis adorabilis*). (After Mulsant and Verreaux.)

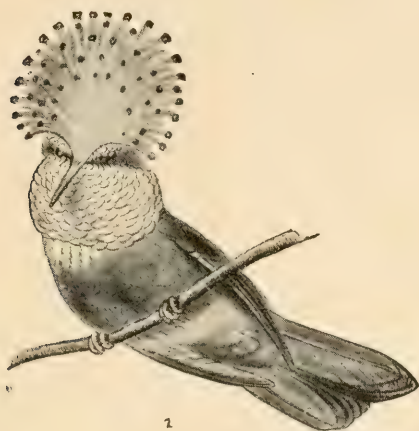


Fig. 1. SPANGLED COQUETTE (*Lophornis reginæ*). (After Gould.)

Fig. 2. GREAT-CRESTED COQUETTE (*Lophornis regulus*). (After Gould.)

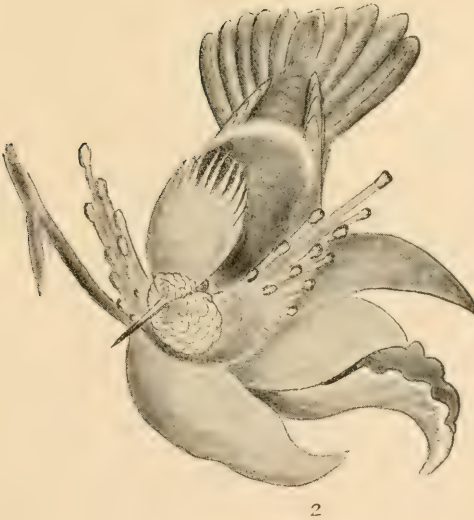


Fig. 1. DE LATRE'S COQUETTE (*Lophornis delatrii*). (After Gould.)
Fig. 2. TUFTED COQUETTE (*Lophornis ornatus*). (After Gould.)



Fig. 1. FRILLED COQUETTE (*Lophornis magnificus*). (After Gould.)
Fig. 2. HELIODORE'S WOOD-STAR (*Aeestrura heliodori*). (After Gould.)

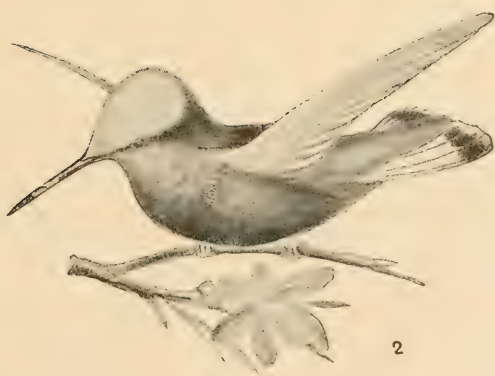


Fig. 1. ALINE'S PUFF-LEG (*Eriocnemis alinæ*). (After Gould.)
Fig. 2. SNOW-CAP (*Microchera albocoronata*). (After Gould.)

CAUSE OF THE CHANGEABLE HUES OF HUMMING BIRDS.

Many persons may naturally wish to know the cause or causes of this brilliant metallic coloration of Humming Birds. This is a subject which has been investigated by physiologists, who have found that in most cases it depends on the *structure* of the feathers, and not on the presence of coloring matter or pigment.

A few days since [says Mr. Martin] we were examining a Humming Bird, the gorget of which was an intense emerald-green; but on changing the light (that is, altering its angle of incidence), the emerald was changed to velvet-black. Audebert considered this changeableness to be due to the organization of the feathers, and to the manner in which the luminous rays are reflected on falling upon them; and of this we think there can be little doubt, for each feather, when minutely inspected, exhibits myriads of little facets so disposed as to present so many angles to the incidence of light, which will be diversely reflected according to the position of the feather, and in some positions not reflected in any sensible degree, and thus emerald may become a velvet-black. Lesson supposes that the brilliant hues of the plumage of the Humming Birds are derived from some elements contained in the blood, and elaborated by the circulation—a theory we do not quite understand, inasmuch as color is the result of the reflection of some rays and the absorption of others, caused by the arrangement of the molecules of any given body. He adds, however, that the texture of the plumes plays the principal part, in consequence of the manner in which the rays of light traverse them or are reflected by the innumerable facets which a prodigious quantity of barbules or fibers present. All the scaly feathers, he observes, which simulate velvet, the emerald, or the ruby, and which we see on the head and throats of the *Epimachi* (as the Grand Promerops of New Guinea), the Paradise Birds and the Humming Birds resemble each other in the uniformity of their formation; all are composed of cylindrical barbules, bordered with other analogous regular barbules, which in their turn support other small ones; and all of them are hollowed in the center with a deep furrow, so that when the light, as Audebert first remarked, glides in a vertical direction over the scaly feathers, the result is that all the luminous rays are absorbed in traversing them, and the perception of black is produced. But it is no longer the same when the light is reflected from these feathers, each of which performs the office of reflector; then it is that the aspect of the emerald, the ruby, etc., varying with the utmost diversity under the incidences of the rays which strike them, is given out by the molecular arrangement of the barbules. It is thus that the gorget of many species takes all the hues of green, and then the brightest and most uniformly golden tints, down to intense velvet-black, or on the contrary that of ruby, which darts forth pencils of light, or passes from reddish orange to a crimsoned red-black. It is thus we think that the everchanging hues of the gorgets of the Humming Birds from black to emerald, ruby, crimson, or flame-color are to be explained.

Brilliant, however, as are the hues reflected from the stuffed Humming Bird, the perfection of their changeable radiance or refulgence can be fully realized only in the living bird.

Bullock, when speaking of the same subject, says that “the preserved specimens were but the shadow in brilliancy to what they were in life. The reason is obvious; for the sides of the laminae or fibers of each feather being of a different color from the surface will change when seen in a front or oblique direction; and as each lamina or fiber turns upon the axis of the quill the least motion, when living, causes the feathers to change suddenly to the most opposite hues.”

BRIEF DESCRIPTIONS OF SOME OF THE MORE BRILLIANTLY COLORED KINDS.

Among the half-thousand species of Humming Birds, the diversity of plumage as well as form is very great. It will not be practicable, therefore, to do more in the way of describing particular kinds than to select those which are most conspicuous in this respect. Before proceeding to do so, it may be well to explain that in a large majority of cases ornamentation is confined to the males alone, the females being as a rule devoid of the refulgent hues and ornamental plumes, and therefore much more like one another than those of the opposite sex. Occasionally, however, as in the genera *Petasophora*, *Eupetomena*, *Panoplit*^{*es*}, *Aglæactis*, *Lampropygia*, and a few others, the sexes are alike in color, or at least not essentially different. In only one species, the Mango Humming Bird (*Lampornis mango*), of Jamaica, is the female more beautiful than the male, having, in addition to the colors possessed by the latter, a brightly colored throat-patch. As a rather remarkable coincidence, it may be mentioned that the largest and smallest species of the family, *Patagona gigas* and *Mellisuga minima*, are among the most plainly colored of all, with little difference between the sexes.

Perhaps the most remarkable of Humming Birds, though more distinguished for the extraordinary development of its tail feathers than for brilliancy of plumage, is the Marvellous Humming Bird (*Loddigesia mirabilis*), of Peru. An idea of the form of the tail in this elegant bird may be obtained from the outline figures on Plate XXIII. Its coloration while not conspicuous for brilliancy in such a brilliant coterie, is nevertheless very pretty: Crown azure-blue, back golden green, tail violet-black, and lower parts pure white, with a gorget of emerald-green bordered on each side by a line of coppery red.

The Topaz-throated or King Humming Birds (genus *Topaza*) are among the largest of the family and are further conspicuous for their elegant form and brilliant plumage. There are two species, the Crimson Topaz (*T. pella*), of Guiana and the Lower Amazons, and the Fiery Topaz (*T. pyra*) of the northern tributaries of the great South American river. The former is much the better known and is a truly magnificent bird, some 8½ inches in total length, although some 3 inches of this are taken up by the lengthened caliper-like tips of the second pair of tail feathers. The general color is a brilliant metallic crimson, the whole throat of the most glittering, burnished golden-yellow or topaz, changing to emerald-green, encircled by velvety black, which covers also the sides and top of the head.

The Fire-tailed or Comet Humming Birds (genus *Sappho*) also include two species, belonging to Peru, Bolivia, and the Argentine Republic. "The tails of the males blaze with the radiance of flashes of flame, and their ruby backs, luminous green throats, and under surface present a *tout ensemble* unparalleled in the range of ornithology,"* while Mr.

* D. G. Elliot, in Standard Natural History, Birds, p. 446.

Gould says that the two species generally known under the names of *Sappho** and *Phaon*† are *par excellence* the most gorgeous of birds in existence, so far as regards the coloring of their tails; and well do these living meteors deserve the more general name of *Comets*." The tail of these birds is greatly lengthened, and, when spread is forked, as shown in Fig. 4, Pl. XXI. The upper surface of these feathers is burnished to a degree scarcely to be equaled by any art, and glows with a refulgence not surpassed by any gem, the glorious color heightened by contrast with the bold and sharply defined velvety black tip to each feather. In the *Sappho Comet* (*S. sparganura*) the red color of the tail and rump is of an orange-red or scarlet hue, while in the *Phaon Comet* (*S. phaon*) the color is the loveliest crimson or purple-red.

Allied to the Comet Hummers are the Sylph Humming Birds (genus *Cyanolobia*), the tails of which are of similar form, but gloriously blue and green, shaded with violet, in one species, splendid green in another, and with black centers instead of tips. (See Pl. XXII, Fig. 4.) They inhabit the mountains of northern and western South America.

So far as the coloration of the head alone is concerned, no other Humming Bird equals the Ruby and Topaz (*Chrysolampis moschitus*). "It is a species," says Mr. Gould, "which plays no inconsiderable part as an article of trade; for it is the one *par excellence* of which thousands are annually sent to Europe for the purpose of contributing to the decorations of the drawing-rooms of the wealthy, for the manufacture of artificial flowers, etc.; and well suited is it for such purposes, its rich ruby and topazlike coloring rendering it one of the most conspicuous and beautiful objects imaginable.

One of the most beautiful of Mexican Humming Birds is De Rham's Garnet (*Lamprolaima rhami*). It is a large species, some $4\frac{1}{2}$ inches long; green above; throat, metallic solferino or garnet; breast, rich metallic violet blue, the tail, which is very broad and slightly forked, being of a violet-black hue.

Scarcely less beautiful and considerably exceeding it in size is De Lattre's Sabre-wing (*Campylopterus hemileucurus*), a species which extends from northern Mexico nearly to the Isthmus of Panama. It is of a uniform rich metallic violet-blue color; rump, green; and the tail, white and black in nearly equal proportion. The remarkable structure of the wing of this species, which is about the same as in the genus *Sphenoproctus*, is shown in Fig. 22, on page 299, which represents that of *S. pampa*. A South American congener of this species is the Splendid Sabre-wing (*C. villavicencio*), which has the crown glittering golden-green changing to coppery-red; the throat and breast, glittering blue; and the other portions chiefly dark green.

Undoubtedly the most brilliant of Central American Humming Birds is that curiously local species which is confined to the higher slopes

* *Sappho sparganura* (Shaw).

† *Sappho phaon* (Gould).

of a few of the volcanic peaks in Costa Rica and Veragua, and is known as the Irazú Humming Bird (*Panterpe insignis*). In this the crown is rich metallic blue; the upper parts bronzy green, changing to blue on the upper tail coverts; the breast is also blue, but the whole chest and throat are of the most glowing hues, commencing with golden green exteriorly and passing through golden yellow into orange and finally culminating in scarlet in the center.

The Puff-legs (genus *Eriocnemis*) are beautiful Humming Birds of medium size, which have the legs clothed with the daintiest muffs or puffs imaginable of cottony or downy feathers, white, buff, brown, or black, according to the species. Perhaps the finest of them is the Glowing Puff-leg (*E. vestita*), whose upper tail coverts are of a dazzling brilliancy unsurpassed and seldom, if ever, equaled by any other object in nature. Mr. John Gould, the celebrated author of that most magnificent of all bird books, the Monograph of the Trochilidæ, says:

Everyone who, for the first time, finds himself in front of the compartment of my collection in which this species is placed, gives utterance to some exclamation expressive of the admiration excited by its striking beauty and glowworm-like splendor of its upper tail coverts. This brilliancy is more apparent at certain hours of the day; for instance, it is more beautiful in the evening after sunset than at midday, the brilliancy being relieved by the dark hue of the tail feathers. It is unquestionably one of the finest species of the genus, and one of the most resplendent of the *Trochilidæ*; would that it were possible for me to even faintly depict it! But no, the most finished drawing can be but a phantom of the original, and it is only by an examination of the specimen that my readers can form any adequate idea of the splendor and beauty of this gem; and how much more gorgeous must the bird appear in its native wilds.

These are the mountain valleys of Colombia.

Even more beautiful, in the writer's opinion, is a gloriously-colored Humming Bird found in eastern Ecuador, the *Panoplitès jardinii*; for, while the gorgeous coloring of the Glowing Puff-leg is mainly confined to a limited area, that of Jardine's Humming Bird embraces its entire body. The crown and lower parts are richest metallic violet-blue; the sides of the breast, the back, and the rump, bluish emerald-green; and the wing coverts golden green. It is the excessive refulgence of the two shades of green, however, which gives the plumage of this bird such a splendid brilliancy, for, in certain lights, they glow with more than metallic clearness, while the deep, velvety black of the nape and the snowy white of the tail feathers heightens the effect by their striking contrast. "The accompanying plate," says Mr. Gould, "is intended to represent one of the most beautiful of the *Trochilidæ* yet discovered. I say intended, for whatever success may have attended my attempts to convey an idea of the beauty of these living gems, I must confess that the means at my command are utterly inadequate to do justice to the present species, whose crown, back, shoulders, and chest sides are clothed with hues of metallic blue and green of such resplendent brilliancy that it is quite impossible to represent them on paper."

Of the West Indian Humming Birds the most exquisite is Princess Helena's Hummer (*Calypte helenæ*), of Cuba. This is perhaps the very smallest of birds, being even less than the *Mellisuga minima*, of Jamaica and Haiti, which has hitherto enjoyed the distinction of being considered the smallest of existing birds. Princess Helena's Humming Bird is rich metallic blue above (a very unusual color in this family), and white beneath, the entire head, including the gorget with its ruff-like lateral projections, being the most beautiful metallic rose-red or crimson.

A much larger species belonging to the Lesser Antilles, the Purple Carib (*Eulampis jugularis*), however, contests the claim of the little Cuban gem to be considered the most richly colored of Antillean Hummers. The Purple Carib has the upper parts velvety black, except the wings and upper tail-coverts, which are of a burnished bluish green hue, while the throat and breast are of a rich garnet-purple.

The most remarkable, however, of West Indian Humming Birds is the Long-tailed Hummer (*Aithuras polytmus*), which Mr. Gosse styles "the gem of Jamaican Ornithology," adding that "its slender form, velvet crest, emerald bosom, and lengthened tail plumes render it one of the most elegant even of this most brilliant family."

A truly noble Humming Bird is the Mountain Nymph (*Oreonympha nobilis*), of the Peruvian highlands, a bird approaching the Giant Hummer (*Patagona gigas*) in size, but otherwise not to be compared with that somberly clad species. The Mountain Nymph is about 7 inches in length, of which about half is taken by the deeply forked but broad-feathered tail. The forehead and side of the head are black, the rest of the head dark blue; the throat is metallic emerald green, the lower portion ornamented by a beard-like tuft of lengthened feathers of a rich metallic reddish purple. The upper parts of the body are bronzy, the lower parts white.

The most elaborately decorated Humming Birds belong to the group known as Coquettes (genera *Lophornis* and *Polemistria*), on account of their frilled, ruffled, and bespangled plumage, their ornamentations being confined to the head or neck. There are about ten species (of which all but three occur only south of the Isthmus of Panama), the most beautiful of which is perhaps the Frilled Coquette (*L. magnificus*) of Brazil. In this there is a fan-like ruff or frill on each side of the neck, of snowy white, but each feather tipped with a crescent-shaped bar of glittering green; the crest, of pointed feathers, is rich chestnut or rufous, while the throat and forehead are emerald green.

Hardly so beautiful but more curiously adorned is Princess Helena's Coquette (*L. helenæ*), of Mexico and Central America. In this the lapwing-like crest is dark green, the throat glittering green set in a black border; from each side of the occiput spring three long hair-like black plumes, while on each side of the neck is a tuft or ruff of black feathers streaked with buff.

The Adorable Coquette (*L. adorabilis*) inhabits parts of Costa Rica

and Veragua. It has the forehead dull ruby red or copper color; the very pointed crest snow white, and a tuft of pointed feathers on each side of the head greenish black.

The Spangled Coquette (*L. stictolophus*) has a very conspicuous, almost fan-shaped crest of a bright rufous color, dotted or spangled with emerald green.

The Frilled Coquette (*L. ornatus*) has the forehead and throat rich metallic green; the crest of pointed feathers, chestnut; from each side of the neck project lengthened narrow feathers of a rufous color, each with an expanded tip of metallic green.

The Coquette Humming Birds are all of small size, most of them less than 3 inches long, and none of them much over that length, and, together with the genera *Popelairia* and *Discura*, constitute a strongly marked group or section of the family, strikingly characterized by the presence, in both sexes, of a distinct band of white or buff across the rump, a feature wanting in all other genera.

The Sun-gem (*Heliactin cornuta*), of Brazil, is one of the most curious as well as beautiful of Humming Birds, and is furthermore unique in both form and plumage. The tail is long and wedge shaped, and the head is ornamented by a flattened tuft of broad imbricated feathers springing from each side of the occiput, the color of these tufts being a glowing metallic scarlet, passing into golden yellow at the tips. The forehead and crown are shining greenish blue, the throat velvety black, the rest of the under parts mostly white, and the upper parts bronzy green,—certainly not a very extraordinary coloration for a Humming Bird; but, in the flattened head-tufts mentioned, there seems to be concentrated enough splendor of color to make up for the absence of brilliancy from the rest of the plumage, and quite justifying the name which has been given the bird.

In the mountains of Veragua and Costa Rica dwell two little Humming Birds called "Snow-caps" (genus *Microchera*), which are altogether unlike any others in their coloration. The whole top of the head is snow white, while the rest of the plumage is rich plum purple (in *M. parvirostris*) or blue-black (*M. albocoronata*). This coloration is remarkable for its chaste simplicity, and the little creatures which wear it, hardly half as big as our Ruby-throat (*Trochilus colubris*), are certainly unique in their dainty loveliness.

HUMMING BIRDS OF THE UNITED STATES.

Within the borders of the United States only seventeen species of Humming Birds have been found, and of this number only seven can be considered as properly belonging to our country, their breeding range being chiefly or entirely within our limits. These are the Ruby-throated Humming Bird (*Trochilus colubris*), Black-chinned Humming Bird (*T. alexandri*), Anna Humming Bird (*Calypte anna*), Broad-tailed Humming Bird (*Selasphorus platycercus*), Rufous Humming Bird (*S.*

rufus), Allen's Humming Bird (*S. alleni*), and Calliope Humming Bird (*Stellula calliope*). Of the remainder six are Mexican species, barely crossing our border, as follows: Rivoli Humming Bird (*Eugenes fulgens*), Blue-throated Humming Bird (*Caligena clemencie*), Lucifer Humming Bird (*Calothorax lucifer*), Rieffer's Humming Bird (*Amazilia fuscicaudata*),* Buff-bellied Humming Bird (*A. cerviniventris*), and Circe Humming Bird (*Iache latirostris*). One species, Costa's Humming Bird (*Calypte costae*), is common to southern California, Lower California, and western Mexico; another, Xantus's Humming Bird (*Basilinna xantusi*), is peculiar to Lower California, and therefore not belonging to the United States as politically bounded. The two remaining species are of uncertain range, one of them, the Violet-throated Humming Bird (*Trochilus violajugulum*), being known from a single specimen obtained in southern California, and the other, Flores's Humming Bird (*Selasphorus floresii*), having been obtained at two widely separated points, Bolanos, Mexico, and San Francisco, California, and only one specimen at each place. The species first mentioned above is the only one that belongs to the extensive region east of the Rocky Mountains, even semi-tropical Florida having hitherto failed to produce a single additional species, even as a straggler or accidental wanderer from more southern lands. It is true that Mr. Audubon described and figured in his great work a species which he called the Mango Humming Bird (*Trochilus mango*), from a specimen given him by Dr. Bachman, said to have been captured at Key West, Florida; but the species† proves to be not even a West Indian one, but belongs to Brazil and other parts of South America, and possibly was not found at Key West, as alleged. Another South American Hummer, the Tobago Humming Bird (*Aggyrtia tobaci*) has been recorded as North American on the strength of the alleged capture of a specimen at Cambridge, Massachusetts; but, while the identification is correct, there is circumstantial evidence that the specimen was accidentally or carelessly substituted for an example of the common Ruby-throat in the shop of the taxdermist who mounted it.

Of the seventeen kinds of Humming Birds which occur within the limits of the United States decidedly the finest species is that known as the Rivoli Humming Bird (*Eugenes fulgens*), a bird of the Mexican table-lands, but occurring also in southern Arizona. This fine hummer is nearly 6 inches in length, being with one exception‡ much the largest in our list. The male has the top of the head rich metallic violet, the throat brilliant emerald-green, contrasted very abruptly with the deep

*This species occurs throughout Central America, from northeastern Mexico southward, and also in northwestern South America as far as Ecuador.

†The specimen in question is now in the National Museum collection, having been given to Professor Baird by Mr. Audubon. It is not an example of the true Mango Humming Bird (*Lampornis mango*), which is a Jamaican species, but belongs to the species known as *L. violicauda* (Bodd.).

‡The Blue-throated Humming Bird (*Caligena clemencie*), inhabiting the same region, is about the same size.

black of the breast, while the upper parts are dark bronzy green. These various hues are so arranged or contrasted that only one of them can be seen at once, every change in the bird's position bringing a different color into view. The most brilliantly colored of our Humming Birds are species of the genera *Calypte* and *Selasphorus*, the former having two and the latter four species within our limits, all of them belonging to the western portion of the country.

The males of the species of *Calypte* have the whole top of the head of the same brilliantly metallic hue as the gorget, in which respect they differ from all other of our hummers excepting the *Selasphorus floresii*, which is possibly a hybrid between *Calypte anna* and *Selasphorus rufus* or *S. alleni*. In Anna's Humming Bird (*C. anna*) the crown and gorget are of a richly burnished crimson, changing to purple or even bluish in certain lights. Costa's Humming Bird (*C. costae*) is a much smaller species, and has the lateral feathers of the gorget much elongated, the gorget and crown being of the richest violet, changing to purple, blue, and even green.

The Rufous Humming Bird (*Selasphorus rufus*) and Allen's Humming Bird (*S. alleni*) have the gorget of a surpassingly vivid fiery red or metallic scarlet, changing to crimson, golden, and even brassy-green, according to the direction of the light, or glowing like a live coal when viewed from a certain direction. So far as plumage is concerned these two species are very much alike, but *S. rufus* has the upper parts deep rufous or brick-color, tinged with green on the back, whereas *S. alleni* is almost entirely green above. The Broad-tailed Humming Bird (*S. platycercus*) is larger than either of the preceding species, and has the gorget soft solferino-pink, with its lateral feathers not elongated—those of the other two being conspicuously lengthened, as in the species of *Calypte*. The remaining North American species of *Selasphorus*, Flores's Humming Bird, has not only the gorget, with its elongated lateral feathers, vivid metallic scarlet, but the whole top of the head also; otherwise, it resembles most in color the *S. alleni*. It is one of the rarest of humming birds, only two examples having been met with, one of them near Bolanos, in Mexico, the other near San Francisco, California.

The Lucifer Humming Bird (*Calothorax lucifer*) has the deeply-forked gorget of a vivid violet-purple, changing to reddish-purple or blue, according to the light. It is the only one of our North American species having a curved bill.

The Calliope Humming Bird (*Stellula calliope*) differs from all others in having the feathers of the ruff narrowed and strongly individualized, each being snow-white for the basal portion and metallic purple at the tip.

The three species of the genus *Trochilus* differ conspicuously from one another in the color of the gorget. In the Ruby-throat (*T. colubris*) its color is, as the name indicates, a glowing ruby-red. In the Black-

chinned Humming Bird (*T. alexandri*) it is velvet-black for the upper half and metallic violet, changing to blue, on the lower. In the Violet-throated Humming Bird (*T. violajugulum*), a species so rare that but a single specimen has been obtained, it is lilac-purple.

We have now exhausted the list of North American Humming Birds, the males of which are adorned with true gorgets, and have come to a small group of species which are not only characterized by the absence of this ornament (though the throat is brilliantly colored in them all) but also by the form of the bill, which is much broader, with the nasal valves wholly unfeathered and somewhat swollen, the color of the bill, in life, being reddish (sometimes deep red) with a dusky tip, whereas in all the other North American hummers the bill is entirely or mainly black. Of this group there are three species known to cross the Mexican boundary into the southern parts of Texas and Arizona, while another is peculiar to Lower California. The latter is Xantus's Humming Bird (*Basilinna xantusi*), the only known congener of which is the White-eared Humming Bird (*B. leucotis*) of the Mexican highlands. The male of Xantus's Humming Bird has the forehead dark blue, the chin and a broad stripe beneath the eye velvety black, the throat and chest brilliant emerald-green, and the tail chestnut. Behind the eye is a broad white streak. Its Mexican relative is very similar, but differs in the color of the tail, which is blackish with the middle feathers greenish bronze, and in the forehead being much brighter blue.

The Circe Humming Bird (*Iache latirostris*) belongs to western Mexico; but occurs just beyond the border in Arizona. The male is bronzy green above, the under parts brilliant green, changing to sapphire-blue on the throat, the under-tail coverts white.

The remaining two species occur in the lower Rio Grande Valley of Texas and belong to the genus *Amazilia*. They agree in being bronzy green above, the tail rufous or chestnut (with feathers margined at tips with bronzy), and in being brilliant green below, changing to brownish or buffy posteriorly. Reiffer's Humming Bird (*A. fuscicaudata*) has the belly and flanks brownish gray, under tail coverts deep cinnamon, and upper tail coverts chestnut. The Buff-bellied Humming Bird (*A. cerviniventris*) differs in having the belly, flanks, and under tail coverts pale cinnamon or buff, and the upper tail coverts chiefly green or bronzy.

The following "key" is intended to facilitate the identification of genera merely, and excludes very numerous forms not found within the geographical limits indicated above, though those of contiguous territory are included. The "key" is essentially the same as that on pages 303 to 309 of the author's "Manual of North American Birds" * modified, however, to better adapt it to the present work.

* A Manual of North American Birds, by Robert Ridgway. Illustrated by 461 outline drawings of the generic characters. Philadelphia: J. B. Lippincott Company, 1887. Royal octavo, pp. i-xi, 1-631, pll. i-cxxiv. Frontispiece (portrait of Prof. Spencer F. Baird), and memorial leaf.

KEY TO THE GENERA OF HUMMING BIRDS OCCURRING IN THE UNITED STATES, MEXICO, CUBA, AND THE BAHAMAS.

- a*¹. Anterior toes united for basal half; bill much compressed (except at base), about two-thirds as long as wing, decidedly arched; tail graduated, the middle pair of feathers much longer than the others, all tipped with white or buff; plumage very dull, almost devoid of metallic colors. (Subfamily *Phaëthornithinae*).. *Phaëthornis*.*
- a*². Anterior toes all cleft to the base; bill never much compressed (usually broader than deep), less than two-thirds as long as the wing (except in *Calothorax* and some species of *Doricha*), usually nearly straight (distinctly curved only in *Campylopterus*, *Lampornis*, *Calothorax*, and some species of *Doricha*); tail variable in form, but if graduated the middle pair of feathers neither elongated nor white tipped. (Subfamily *Trochilinae*.)
- b*¹. Inner webs of two outer tail-feathers white, except at end *Eupherusa*.†
- b*². Inner webs of two outer tail-feathers without white, except sometimes at tip.
- c*¹. Exposed culmen not more than .45; tail even, two-thirds as long as wing, the latter 1.75-2.00c *Abeillia*.‡
- c*². Exposed culmen decidedly more than .45.
- d*¹. Tail nearly as long as wing, wedge-shaped, with feathers broad and rounded at tips; shafts of three outer quills much (sometimes enormously) thickened; wing about 2.60 *Sphenoproctus*.§
- d*². Tail much shorter than wing; if wedge-shaped, the feathers narrow and pointed at ends.
- e*¹. Exposed culmen less than one-fourth as long as wing; quills and secondaries rufous, with darker tips or terminal margins *Lamprolaima*.||
- e*². Exposed culmen more than one-fourth as long as wing.
- f*¹. Exposed culmen one-half as long as wing, or longer.
- g*¹. Wing 2.20 or more; tail rounded, the feathers broad; bill long, stout, and straight, nearly as long as tail; outer tail-feathers tipped with white in both sexes *Floricola*.¶
- g*². Wing less than 2.00 (1.30-1.70); tail forked in males, double-ranked in females; bill slender, curved (except in two or three species of *Doricha*); outer tail-feathers tipped with white only in females.
- h*¹. Tail shorter than wing or exposed culmen, the feathers pointed in adult males *Calothorax*.
(P. 358.)
- h*². Tail longer than wing, or else longer than exposed culmen, the feathers not pointed in either sex *Doricha*.*

* *Phaëthornis* SWAINS., Zool. Jour. 1827, 357. Type *Trochilus superciliosus* LINN. (Two species from southern Mexico southward, and numerous species in South America.)

† *Eupherusa* GOULD, Mon. Troch. pt. XIV. 1857. Type, *Ornismya eximia* DELATTR. (One species in southern Mexico, another in Guatemala, a third in Costa Rica and Veragua.)

‡ *Abeillia* BONAP., Consp. I, 1850, 79. Type, *Ornismya abeillei* DELATTR. (One species in southern Mexico and Central America.)

§ *Sphenoproctus* CAB. and HEIN., Mus. Hein. III. 1860, 11. Type, *Ornismya pampa* LESS. (One species in southern Mexico, another in Guatemala.)

|| *Lamprolaima* REICH., Aufz. der Colib. 1853, 9. Type *Ornismya rhami* LESS. (One species in highlands of Mexico and Guatemala. The male has the throat purplish red, the other under parts rich purplish blue.)

¶ *Floricola* ELLIOT, Class. and Synop. Troch., Sept. 1878, 82. Type, *Trochilus longirostris* VIEILL. (Two species inhabiting pine forests of Mexican highlands, another in Guatemala, two or three others in mountains of northern South America.)

*f*². Exposed culmen less than half as long as wing.

*g*¹. Tail 2.25 or more, rounded, feathers very broad the three outermost broadly tipped with white in both sexes; shafts of three outer quills very strong, often enormously thickened.....*Campylopterus*.†

*g*². Tail less than 2.25.

*h*¹. Tail more than three-fourths as long as wing; forked for more than one-fourth its length, the feathers broad and rounded at tips; adult males wholly bright green beneath, the tail blue-black or bronze-black.

*i*¹. Middle tail-feathers blue-black, like the rest (tipped with dull grayish in the Mexican species); females and young males with outer tail-feathers grayish white or pale grayish at tip and base, blue-black in middle portion.....*Chlorostilbon*.‡

*i*². Middle tail-feathers bronzy; females and young males without grayish base or tip to outer tail-feathers.....*Sporadinus*.§

*h*². Tail less than three-fourths as long as wing, variously shaped, but never forked for more than one-fourth its length; adult males never entirely green beneath.

*i*¹. Lower parts white, the sides sometimes green or spotted with green; sexes alike.

*j*¹. Exposed culmen decidedly more than half as long as tail; top of head usually metallic blue or violet.....*Uranomitra*.||

*j*². Exposed culmen not more than half as long as tail; top of head never blue or violet.....*Agrytria*.¶

*i*². Lower parts never pure white.

*j*¹. Tail bright bluish green or greenish blue, crossed near end by a broad band of blue-black.....*Petasophora*.**

*j*². Tail not bright bluish green, etc.

*k*¹. Feathering of forehead extended forward as far as anterior end of nostrils and partly or entirely covering the scale over the nostrils.

* *Doricha* REICH., Aufz. der Colib. 1853, 12. Type, *Trochilus enicurus* VIEILL. (One Mexican, one Guatemalan, one Costa Rican, and two Bahaman species.)

† *Campylopterus* SWAINS., Zool. Jour. 1826, 328. Type, *Trochilus largipennis* BOBB. (One Mexican species—a splendid bird—one peculiar to Guatemala, and several in northern South America. The first, *C. hemileucurus* (LICHT.), is the largest humming bird found north of the Isthmus of Panama, being nearly 6 inches in length. It is very possibly the species to which Dr. R. W. Shufeldt, U. S. A., refers in a letter dated June 9, 1886, as having been seen by him the day before, near Fort Wingate, New Mexico, and which he described as being “fully large enough for *Eugenes fulgens*, and whirred like an old quail.”)

‡ *Chlorostilbon* GOULD, Mon. Troch. pt. v, 1853. Type, *Trochilus pucherani* BOURC. and MULS. (Three species in Mexico, one in Porto Rico, and about six in South America.)

§ *Sporadinus* BONAP., Rev. et Mag. Zool. 1854, 255. Type, *Trochilus riccordi* GERV. (One species in Haiti, one in Cuba and Bahamas, and apparently one peculiar to Bahamas.)

|| *Uranomitra* REICH., Aufz. der Colib. 1853, 10. Type, *Trochilus franciae* BOURC. and MULS. (Four species in Mexico, one in Honduras, one in Colombia, and one in Peru.)

¶ *Agrytria* REICH., Troch. Enum. 1855, 7. Type, *Trochilus brevirostris* LESS. (Two Mexican and numerous South American species; some of the latter with lower parts mostly green; one of the former, with buffy or rufous belly and flanks.)

** *Petasophora* GRAY, List Gen. B. 1840, 13. Type, *Trochilus serrirostris* VIEILL. (One species in Mexico and Guatemala, several in Central and South America.)

1. Wing more than 2.40; adult males without a brilliant gorget, or else the latter neither red, purple, nor violet.
- m¹. Tail partly rich chestnut, glossed with bright purple; bill rather distinctly curved..... *Lampornis*.*
 - m². Tail without chestnut or bright purple; bill straight.
 - n¹. Tail wholly (male) or partly (female) greenish bronze-
Eugenes. (P. 319.)
 - n². Tail wholly or chiefly black..... *Caligula*. (P. 323.)
2. Wing less than 2.25; adult males with a brilliant gorget of metallic red, purple, or violet.
- m¹. Middle tail feathers narrower near end than at base.
 - n¹. Exposed culmen 0.60 or more; outer tail feathers tipped with white only in females.
 - o¹. Outer tail feather not decidedly shorter than middle pair, and not conspicuously narrower than the next; adult males with six innermost quills abruptly much smaller and narrower than the rest.
Trochilus. (P. 325.)
 - o². Outer tail feather decidedly shorter than the middle pair and abruptly narrower than the next (except in *C. helenæ*); adult males with innermost quills normal.
 - p¹. Tail without any rufous; adult males with tail forked (but feathers not pointed) and top of head brilliantly metallic, like gorget. *Calypte*. (P. 333.)
 - p². Tail partly rufous, more or less graduated, in both sexes; adult males with top of head greenish or bronzy, totally unlike gorget (except in *S. flouresii*)..... *Selasphorus*. (P. 339.)
 - n². Exposed culmen not more than 0.50; outer tail feathers tipped with white in both sexes.... *Atthis*. (P. 379.)
 - m². Middle tail feathers broader near end than toward base.
Stellula. (P. 354.)
 - k. Feathering of forehead scarcely extending beyond posterior portion of nostrils, the scale over latter therefore naked for the greater part at least; bill very broad at base.
 - 3. Tail blue-black in male, deeply emarginated, the middle feathers tipped with dull grayish; in female shallowly emarginate, green basally, blue-black terminally, the outer feathers tipped with grayish white; adult males metallic green beneath, the throat bluish.
Iache. (P. 371.)
 - F. Tail not blue-black, etc.
 - m¹. Exposed culmen more than half as long as tail.
 - n¹. Tail rufous or chestnut, the feathers usually with dusky or bronzy terminal margins..... *Amazilia*. (P. 362.)
 - n². Tail dull greenish, with dusky subterminal band (except on middle feathers), the outer feathers tipped with dull, light grayish brown; plumage in general very dull, the lower parts dull brownish gray..... *Phaoptila*.†
 - m². Exposed culmen not more than half as long as tail.
Basilia. (P. 388.)

* *Lampornis* SWAINS., Zool. Jour. III. 1827, 358. Type, *Trochilus mango* LINN. (One Mexican, several West Indian, and several South American species.)

† *Phaoptila* GOULD, Intr. Mon. Troch. Oct. ed., 1861, 169. Type, *Cyanomyia (?) serotina* GOULD. (The single known species peculiar to Mexico.)

In order to render the present work more useful to those who wish to know more about the Humming Birds of our country, the principal synonymy, a description, and a brief account of the habits of each species (so far as known), is given in the following pages.

GENUS **EUGENES** GOULD.

Eugenes GOULD, Mon. Troch. pt. XII, 1856; Introd. Troch. Oct. ed., 1861, 57. Type, *Trochilus fulgens* SWAINS.

GENERIC CHARACTERS.—Tail less than two-thirds as long as wing, slightly forked or emarginated; bill straight, more than one-third as long as the wing and about half as long as the longest tail feathers. Size, large (total length, 4.50 inches or more; wing, 2.90–3.10).

Adult males with top of head rich metallic violet or violet-blue, the chin and throat brilliant emerald-green or light bluish green; upper parts dark bronzy green; lower parts (except throat and lower tail-coverts) plain dusky greenish or dull bronzy; lower tail-coverts paler greenish or bronzy, bordered with paler. *Adult females* with top of head dull brownish gray or grayish brown, rest of upper parts bronzy green; lower parts pale brownish gray, the sides and flanks tinged with green; a small white postocular spot.

There are only two species known of this genus, one (*E. fulgens*) inhabiting the highlands of Guatemala and Mexico, north to southern Arizona, the other (*E. spectabilis*) the elevated portions of Costa Rica. They may be distinguished by the following characters:

- a¹. *Adult male*: Breast very dark bronzy green, appearing nearly black in some lights. *Adult female*: Outer tail-feathers very broadly (for about .35–.45) tipped with pale gray or dull grayish white. Exposed culmen 1.15. *Young*: Similar to adult female, but feathers of upper parts bordered terminally with pale buffy. *Hab.* Highlands of Mexico and Guatemala, north to southern Arizona.
- E. fulgens* (SWAINS). *Rivoli Humming Bird.* (P. 319.)
- a². *Adult male*: Breast dull bronzy, or bronzy green, the feathers dull brownish gray immediately beneath surface; lower tail-coverts green, margined with pale buffy. *Adult female*: Outer tail-feathers more narrowly (for about .20–.25) tipped with darker brownish gray; exposed culmen 1.40–1.50. *Hab.* Highlands of Costa Rica. *E. spectabilis* (LAWR). *Admirable Humming Bird.**

RIVOLI HUMMING BIRD. *Eugenes fulgens* (SWAINS).

(Plate XXXV.)

Trochilus fulgens SWAINS. Phil. Mag. I, 1827, 441.

Eugenes fulgens GOULD, Mon. Troch. pt. XII, 1856, pl. 7; vol. II, 1861, pl. 59.

—HENSCHAW, Am. Nat. 1874, 241 (Camp Grant, Arizona); Zool. Wheeler's Surv. 1875, 379.

Refulgent Humming Bird.

L'Eugène de Rivoli (MULSANT and VERREAUX).

Chupamirto verde montero (Puebla; Prof. F. FERRARI-PEREZ).

Chupamirto real de pecho verde y cabeza azul (D'OCA).

* *Helimaster spectabilis* LAWR., Ann. Lyc. N. Y. VIII, 1867, 472. *Eugenes spectabilis* MULS., Hist. Nat. Ois. Mouch. II., 1876, 215.

RANGE.—Table-lands of Guatemala and Mexico; north to southern Arizona.

SP. CHAR.—*Adult male* with crown rich royal purple or hyacinth-blue, throat glittering emerald-green, chest black glossed with bronze or bronze-green, wing-coverts and lower back bronze-green, and tail uniform, bronzy; female and young bronzy-green or bronzy above, dull grayish beneath, more or less spotted with bronze on throat and sides; outer tail-feathers black subterminally, the exterior two to four tipped with pale gray or grayish white: length about 4.50–5.00 inches.

Adult male (No. 105650, Puebla, Mexico, September, 1884; Prof. F. Ferrari-Perez): Forehead dull blackish, with a faint dull green gloss; crown rich metallic royal purple varying to hyacinth-blue, bordered laterally and posteriorly by metallic bronze-green (appearing velvety black when viewed from in front); hind neck, back, scapulars, wing-coverts, rump, and upper tail-coverts metallic bronze-green or greenish bronze; tail uniform deep greenish bronze (more decidedly greenish on middle feathers; remiges dull brownish slate or grayish brown, with a very faint purple gloss. Gorget (including whole throat, chin, and malar region, and extending back much farther laterally than medially) brilliantly metallic yellowish emerald-green, changing to bluish ("beryl") green; chest, breast, and upper median portion of belly deep velvety black when viewed from in front, but metallic greenish bronze when viewed from behind; flanks and lower belly dull grayish brown glossed with greenish bronze; under tail-coverts paler grayish brown, indistinctly margined with pale dull buff; downy femoral tufts white. Lores deep black; a white spot at posterior angle of the eye. Bill entirely deep black; feet dusky. Length (skin), 4.75; wing, 2.90; tail, 1.90 (middle feathers, 1.55); exposed culmen, 1.00.

Adult female (No. 105706, Jalapa, Mexico; Prof. F. Ferrari-Perez): Above bright green, tinged with bronze, becoming duller on top of head, where passing into dull dusky brownish gray on forehead; tail-feathers (except middle pair) bronze green basally, black subterminally, and pale brownish gray terminally, the latter color, also the black, most extensive on the outer feather; remiges uniform slate-brown, very faintly glossed with purple, the tertials with very narrow and inconspicuous terminal margins of white. Lores dusky, with an obliquely horizontal bar of white on the lower portion; a distinct white spot behind the eye. Malar region, chin, and throat dull white, the feathers light brown medially, forming rather distinct stripes, converging on the chin; sides of head beneath eyes (including auriculars), sides of neck, and lateral portions of the body beneath, light brownish gray, the feathers indistinctly margined with whitish, and those on the sides of the breast faintly washed with bronze; under tail-coverts pale brownish gray bordered with white; middle of belly and median line of breast and chest dull white; downy femoral tufts white. Bill black, the lower mandible more brownish, except the terminal portion. Wing,



RIVOLI HUMMING BIRD (*Eugenes fulgens*).

Male. (Cat. No. 105746, U. S. N. M. Puebla, Mexico. Collected by Prof. F. Ferrari-Perez.)

Female. (Cat. No. 105706, U. S. N. M. Puebla, Mexico. Collected by Prof. F. Ferrari-Perez.)

2.60; tail, 1.55 (middle feathers only .10 shorter); exposed culmen, 1.15.*

Immature male (No. 105704, Jalapa, Prof. F. Ferrari-Perez): Intermediate in coloration between the adult male and female, as described above, the crown only partly violet, the throat only partly green, chest slightly mixed with black, etc., the tail exactly intermediate both in form and color. Wing, 2.90; tail, 1.85 (middle feathers .20 shorter); exposed culmen, 1.09.

Young female (No. 99367, Santa Rita Mountains, Arizona, July 5, 1884, E. W. Nelson): Similar to the adult female as described above, but all the contour feathers of the upper parts margined with pale buffy-grayish, and under parts darker, with entire sides distinctly glossed with bronze-green.

This fine Humming Bird was first described by Swainson, in 1827, but only two years later was redescribed by Lesson, who give it the specific name *Rivoli*, in honor of M. Massena, Prince of Essling and Duke of Rivoli. Mr. Gould refers to it as being celebrated "for the beauty of its coloring and the bold style of its markings;" and it is, indeed, one of the finest of the Mexican species, both as to size and beauty of plumage.

The habits of the Rivoli Humming Bird are thus described by Mr. Salvin, in *The Ibis*, 1860, pages 261, 262:

This species is rare at Coban. The place described as frequented by *Amazilia dumerilii*† is where I have found this species in greatest numbers; indeed, with two exceptions, I have never met with it elsewhere near Dueñas. It is a most pugnacious bird. Many a time have I thought to secure a fine male, which I had perhaps been following from tree to tree, and had at last seen quietly perched on a leafless twig, when my deadly intention has been anticipated by one less so in fact, but to all appearance equally so in will. Another Humming Bird rushes in, knocks the one I covet off his perch, and the two go fighting and screaming away at a pace hardly to be followed by the eye. Another time this flying fight is sustained in midair, the belligerents, mounting higher and higher till the one worsted in battle darts away seeking shelter, followed by the victor, who never relinquishes the pursuit till the vanquished, by doubling and hiding, succeeds in making his escape. These fierce raids are not waged alone between members of the same species. *Eugenes fulgens* attacks with equal ferocity *Amazilia dumerilii*, and, animated by no high-souled generosity, scruples not to tilt with the little *Trochilus colubris*. I know of hardly any species that shows itself more brilliantly than this when on the wing, yet it is not to the midday sun that it exhibits its splendor. When the southerly winds bring clouds and driving mists between the volcanoes of Agua and Fuego and all is as in a No-

* The dimensions of an adult female taken May 23, 1888, in Carr's Cañon, Huachuca Mountains, Arizona, by Mr. Will W. Price, are as follows: Length (skin), 4.80; wing, 2.70; tail, 1.70; exposed culmen, 1.10.

† The "western boundary of the llano of Dueñas, which, starting from the village, and bounded to the eastward by the river Guacalate, extends, sweeping by the base of the Volcan de Fuego, almost to the Hacienda of Capertillo, its southern extremity. Dispersed over this plain is found, in groves, patches, and isolated trees, a *Tree-Convolvulus*, bearing a white flower and attaining an average height of about 25 or 30 feet."

vember fog in England, except that the yellow element is wanting, then it is that *Eugenes fulgens* appears in numbers; *Amazilia devillei*, instead of a few scattered birds, is to be seen in every tree, and *Trochilus colubris* in great abundance. Such animation awakes in Humming Bird life as would hardly be credited by one who had passed the same spot an hour or two before; and the flying to and fro, the humming of wings, the momentary and prolonged contests, and the incessant battle cries seem almost enough for a time to turn the head of a lover of these things. I have fifteen males from Dueñas to one female.

The Rivoli Humming Bird was first added to the fauna of the United States by Mr. H. W. Henshaw, while acting in the capacity of naturalist to Lieutenant Wheeler's expedition, under the auspices of the Engineer Department, U. S. Army. On September 24, 1873, a single immature female was taken by him in the immediate vicinity of Camp Grant, Arizona. It was found along a small stream issuing from the mountains, and when first seen was being pursued by another hummer which Mr. Henshaw is sure was the same species. The following year, he again found it in that Territory, though not in the same locality.

Fully expecting [says he*] to find this species a summer inhabitant of the mountain districts of southern Arizona, I was not surprised when, on reaching Mount Graham, I found the supposition verified. During the first three days of August I secured two adult males and another female. In talking with the lumbermen of the neighborhood I learned that the large Humming-Birds had been quite common earlier in the summer, but at that time they had nearly disappeared, though the smaller birds (*S. platycercus*) were still quite numerous. I suppose that during the mating season they had made themselves more conspicuous, and indeed had probably frequented the little valley in which the cabins of these men were built in considerable numbers, but had retired, each to some secluded spot deeper in the mountains to rear their young.

A very beautiful nest was discovered, which save its large size resembles in its construction the best efforts of the little eastern Ruby Throat. It is composed of mosses nicely woven into an almost circular cup, the interior possessing a lining of the softest and downiest feathers, while the exterior is elaborately covered with lichens, which are securely bound on by a network of the finest silk from spiders' webs. It was saddled on the horizontal limb of an alder, about twenty feet above the bed of a running mountain stream, in a glen which was overarched and shadowed by several huge spruces, making it one of the most shady and retired nooks that could be imagined. The two young which it contained had just been hatched, and the female was returning to the nest when I caught sight of her, having probably carried away the broken eggshell, fragments of which were still in the nest. The dimensions of the nest are as follows: Depth, externally, 1.50; internally, 0.75; greatest external diameter, 2.25; internal diameter, 1.15.

The most recent information that we have respecting the habits of this species is by Mr. Otho C. Poling, in *The Auk* for October, 1890 (pages 402, 403), which is as follows:

This Humming Bird is a summer resident in the Huachuca Mountains, Arizona. It arrives in May, but is nowhere plentiful until the mescal shrubs begin to blossom, about the middle of June. From this time on during the entire summer one may observe on almost any hillside below the pine belt large clusters of bright red or yellow flowers spreading out from the stalks 10 or 15 feet high. There are many vari-

* Ornithology of Wheeler's Exp., 1875, pp. 379, 380.

eties of this plant and all are favorite feeding resorts of the Rivoli Hummer. I have shot as many as a dozen in a day simply by sitting down and watching for them to come and feed. It is necessary to select a well-matured plant, and at the proper elevation, as well as in good surroundings of spruce pines. While feeding these birds range from 4,500 to 8,000 feet altitude or up to the pine belt, their favorite grounds being where the pines end on the downward slope. Their flight is exceedingly rapid at times, but they often fly slowly so that the wings can be easily seen during the beats. The noise made by this bird's wings during a rapid flight is not like the buzzing of the small Hummers' wings, the beats being more slow and distinct, without any buzzing noise.

Their note is a twittering sound, louder, not so shrill, and uttered more slowly than those of the small Hummers.

From July 5 to 9 I examined nine females; one had already laid and the other contained eggs that would probably have been laid within from 1 to 4 days. On July 10 my search for the nest was at last rewarded. The country I had explored was from 7,500 to 10,000 feet elevation, where a dense growth of tall spruce pines covers the hillsides. These pines are all more or less covered with bunches of moss and lichens. I was resting on a rock in the cool shade beneath one of these trees when I was suddenly attracted by the noise of a Hummer's wings close to my head. Looking up I saw a female Rivoli making perpendicular dives at me. After repeating this until I had moved off a sufficient distance, she alighted upon a small dead twig and there sat watching me for some moments. As all remained quiet she now flew about the tree slowly, and when about 50 feet up made a rapid dart to the crotch of a mossy limb about 10 feet from the trunk, where the nest was built, nearly hidden from the ground. I now came up, and by throwing things at her flushed her off the nest, but she at once returned to it. After much trouble the nest and the two eggs it contained were secured in safety.

The nest was firmly attached to the limb just beyond a crotch, the limb at the nest being about an inch in diameter. It is of a uniform oval shape, its diameter outside being from 2.03 to 2.62 inches; inside from 1.20 to 1.45. The depth outside is 1.55 inches; inside it is 0.62. It is composed outwardly of bits of fine moss and lichens, and is indistinguishable from the limbs about it. It is well lined on the inside with many star-shaped downy seeds of a delicate cream color, similar to those of the common thistle of the East, but smaller and softer. The two eggs are pure white, shaped alike at both ends, and measure 0.53 by 0.37 and 0.52 by 0.37 inch.

Genus **CÆLIGENA** LESSON.

Cæligena LESS., Ind. and Synop. Gen. Troch. 1832, p. xviii. Type, *Ornismya clemenciae* LESS.

Delatiria BONAP., Consp. i, 1850, 70. Type, *Ornismya henrica* LESS. and DELATRE. *Chariessa* HEINE, Jour. für Orn., May, 1863, 178. Type, *Ornismya henrica* LESS. and DELATRE.

Himelia MULS., Cat. Ois Mouch, 1875, 7. Type, *Ornismya henrica* LESS. and DELATRE, (*vide* ELLIOT).

GENERIC CHARACTERS.—Tail more than two-thirds as long as wing, slightly rounded or double-rounded, the feathers very broad; bill nearly straight, less than one-third as long as the wing, and less than half as long as the longest tail-feathers. Size, large (total length 4.25 or more; wing, 2.60 or more). Colors, above rather dull metallic greenish, changing to purplish-black on upper tail-coverts and tail (except in *C. hemileuca*); ear-coverts dusky, or else brilliant green, always bordered above by a distinct white stripe; *adult males* with the throat metallic blue, pale violet or amethyst, reddish purple, or pale emerald-green.

Five species have been referred to this genus, but it is questionable whether all of them really belong to it. They may be distinguished as follows:

- a*¹. Outer tail-feathers broadly tipped with white in both sexes. (*Cæligena* LESS.)
Lower parts dull gray, glossed with green on sides; male with the throat metallic cobalt blue. *Hab.*: Highlands of Mexico, north to southern Arizona; Guatemala. *C. clemenciæ* LESS. *Blue-throated Humming Bird*. (Page 324.)
- a*². Outer tail-feathers not tipped with white in either sex. (*Delattria* BONAP.)
- b*¹. Lower parts dull grayish, glossed with green on sides.
- c*¹. Adult male with throat metallic reddish purple. *Hab.*: Highlands of Guatemala. *C. henrica* (LESS. and DELATT.). *Henri Delattre's Humming Bird*.*
- c*². Adult male with throat metallic violet. *Hab.*: Sierra Madre of southern Mexico. *C. margaritæ* SALV. and GODM. *Mrs. Smith's Humming Bird*.†
- b*². Lower parts white medially, metallic green laterally.
- c*¹. Ear-coverts dusky green; top of head moderately metallic (green); adult male with throat pale emerald-green, the feathers margined with white. *Hab.*: Highlands of Guatemala.
C. viridipallens (BOURC. and MULS.). *Pale-green-throated Humming Bird*.‡
- c*². Ear-coverts and top of head brilliantly metallic emerald-green; adult male with throat pale violet or amethyst. *Hab.*: Highland of Costa Rica.
C. hemileuca (Salv.). *Amethyst-throated Humming Bird*.§

BLUE-THROATED HUMMING BIRD. *Cæligena clemenciæ* LESS.

(Plate XXXVI.)

Ornismya clemenciæ LESS., Ois. Mouch., 1829, 216, pl. 80.

Cæligena clemenciæ LESS., Ind. and Synop. Gen. Troch. 1832, 1p. XVIII. BREWST., Auk, II, Jan., 1885, 85 ("Camp Lowell," Arizona); Apr. 1885, 199 (correction of locality—Sta Catalina Mountains, not Camp Lowell).

Delattria clemenciæ BONAP., Consp. I, 1850, 70.—GOULD, Mon. Troch. pt. IX, 1855, pl. 10; vol. II, 1861, pl. 60.

Clemence's Humming Bird.

Blue-throated Cazique (GOULD).

Le Cæligène de Clémence (MULSANT and VERREAUX).

Oiseau-Mouche de Clémence (LESSON).

Chupamirto real de pecho azul celeste (D'OCA).

RANGE.—Highlands of Mexico, north to southern Arizona.

SP. CHAR.—Size, very large (length more than 4.50, wing 2.90—3.20); lower part dull gray, glossed with green on sides; middle tail-feathers black, and outer ones broadly tipped with white in both sexes; adult male with throat shining blue.

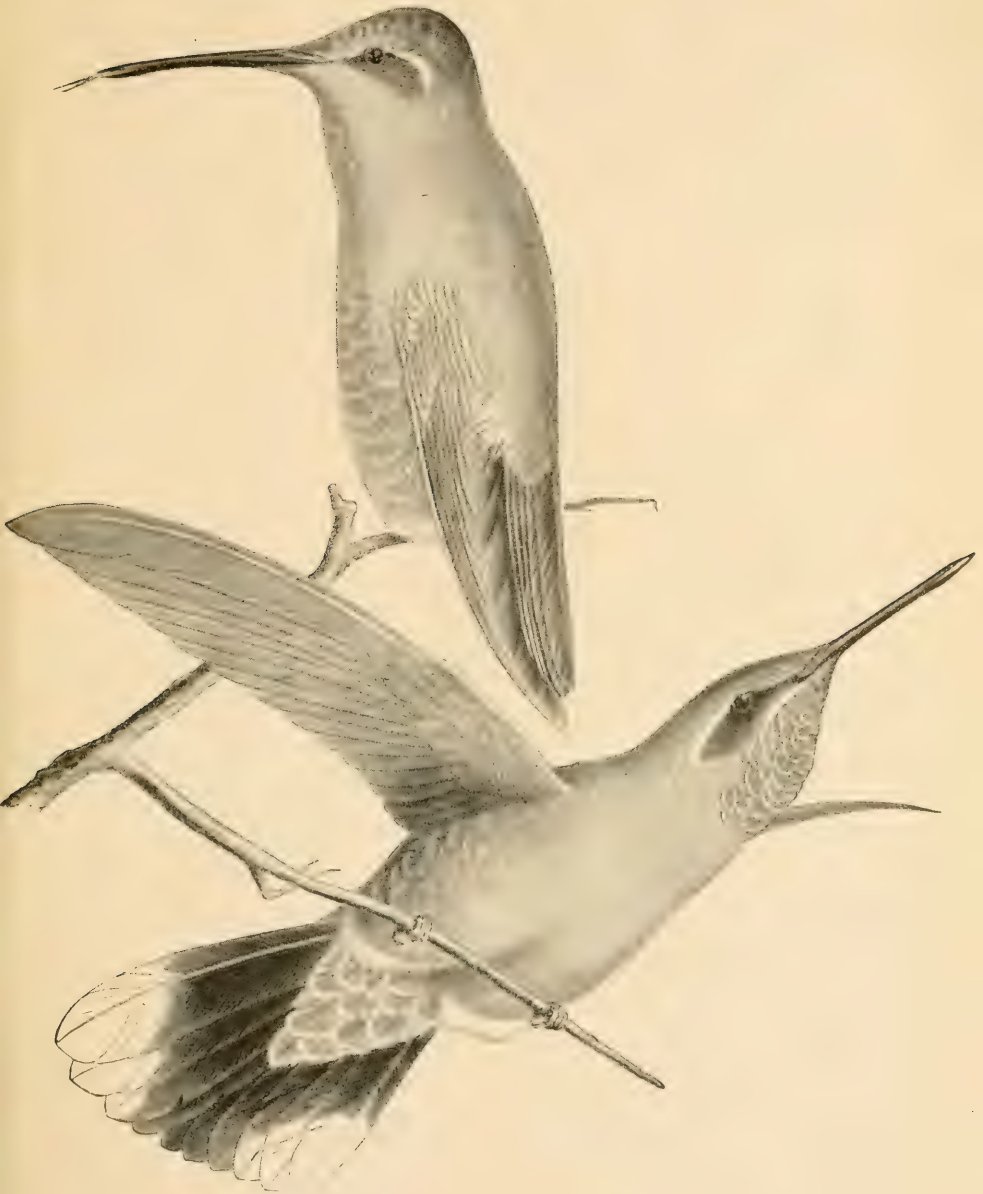
Adult male (No. 76829, Mexico; Mrs. Chauncy Riley): Forehead and crown dull bronze-green, appearing dull olive in certain lights; occiput, hind-neck, back, scapulars, and wing-coverts much brighter green (nearly a grass-green), lower back and rump light, rather dull, bronze-

* *Ornismya henrica* LESS. and DELATTR., Rev. Zool. 1839, 17. *Cæligena henrici* CAB. and HEIN., Mus. Hein. III. 1860, 15.

† *Delattria margaritæ* SALV. and GODM., Ibis, Apr. 1889, 239.

‡ *Trochilus viridipallens* BOURC. and MULS., Ann. Soc. Lyons, 1846, 321. *Cæligena viridipallens* MULS., Hist. Nat. Ois. Mouch. I. 1877, 185.

§ *Oreopyra hemileuca* SALV., P. Z. S. 1864, 584. *Cæligena hemileuca* ELLIOT, Class. and Synop. Troch. 1879, 31.



BLUE-THROATED HUMMING BIRD (*Caligena clemenciae*).

Male. (Cat. No. 76829, U. S. N. M. Mexico. Collected by Mrs. Chauncy Riley.)

Female. (Cat. No. 35159, U. S. N. M. Mirador, Mexico. Collected by Dr. C. Sartorius.)

green, the feathers showing narrow and indistinct paler margins; upper tail-coverts similar, but much darker; tail black, faintly glossed with dull blue, the three outer feathers broadly tipped with white, this broadest (about .70 of an inch) on outer web of exterior feather; remiges dull brownish slaty, very faintly glossed with purplish. A white streak behind eye, above upper margin of ear-coverts, the latter dusky; this color extending beneath eye to, and including, lores; beneath the latter, a buffy, or rusty-whitish rictal streak extends as far back as beneath middle of eye. A large patch, with convex posterior outline, covering chin and whole throat, metallic cobalt-blue, each feather narrowly margined with pale brownish gray—these edgings very conspicuous in certain lights and causing a scale-like appearance; rest of under parts dull brownish gray, the lateral portions glossed with bronze-green, and under tail-coverts broadly margined with white; downy femoral tufts dull white. Bill entirely black. Length (skin), 5.00*; wing, 3.15; tail, 2.20 (middle feathers 2.00); exposed culmen, .92.

Adult female (No. 35159, Mirador; Dr. C. Sartorius): Similar to the adult male, but chin and throat dull brownish gray, similar to but a little paler than the color of the breast, etc. Length (skin), 4.40; wing, 2.80; tail, 1.90; exposed culmen, 1.00.

This large and rather dull-colored species of Humming Bird, named in honor of Madame Clémence Lesson, was first added to the United States fauna by Mr. F. Stephens, who on May 14, 1884, took an adult male in the Santa Catalina Mountains, near Camp Lowell, Arizona, as recorded by Mr. William Brewster, in *The Auk*, January, 1885, p. 85.† It has since been taken in various localities in the southern part of that Territory by different collectors (among whom may be named Mr. Will. W. Price and Mr. Otho C. Poling), but so far as we are aware nothing has been published by them regarding its habits.

Mr. Gould says that he believes the true and restricted habitat of this species to be the moderately high table-land of Mexico, and he adds that, "it is a large and powerful bird . . . distinguished for the quietness of its coloring rather than for any of those brilliant metallic markings so prevalent among humming birds in general."

Genus **TROCHILUS** LINNÆUS.

Trochilus LINN., S. N. ed. 10, I. 1758, 119. Type, by elimination, *T. colubris* LINN.

Cyananthus BOIE, Isis, 1831. Type, *T. colubris* LINN.

Colubris REICH., Syst. Av. Nat. 1849, pl. 40. Type, *T. colubris* LINN.

Archilochus REICH., Aufz. Colib. 1854, 12. Type, *Trochilus alexandri* BOURC. and MULS.

Ornismya MULS. and VERR., Class. Troch. 1865, 91 (*nec* LESS., 1829). Type, *T. alexandri* BOURC. and MULS.

* The measurements before skinning of a male taken at Camp Lowell, Arizona, by Mr. F. Stephens, were as follows: Length, 5.40; extent, 7.50; wing, 3.10; tail, 1.91; culmen from nostril, .88. A skin collected in the Huachuca Mountains, Arizona, by Mr. Will W. Price, measures as follows: Length, 5.00; wing, 3.10; tail, 2.00; exposed culmen, .85.

† The locality was first given as Camp Lowell, but this was subsequently corrected (*The Auk*, April, 1885, p. 199).

GENERIC CHARACTERS.—Male with the metallic gorget not elongated laterally. Tail forked or deeply emarginate, the feathers pointed, but the exterior ones not excessively narrow. Six inner primaries abruptly and conspicuously smaller than the rest, with their inner web more or less notched and toothed at the tip (except in *T. violajugulum*).

The peculiarity above noted in the reduced size and modified form of the six inner primaries is most marked in *T. colubris*, and may be more particularly described as follows: The outer four primaries are of the usual shape, and diminish gradually in size; the remaining six, however, are abruptly much smaller, more linear, and nearly equal in width (about that of inner web of the fourth), so that the interval between the fifth and fourth is from two to five times as great as that between the fifth and sixth. The inner web of these reduced primaries is also emarginated at the end. This character is even sometimes seen in the females, but to a less extent, and may serve to distinguish both *colubris* and *alexandri* from other allied species where other marks are obscured.

In *T. violajugulum* the inner primaries are not obviously abnormal either in size or shape, there being, as is usually the case in Humming Birds, a gradual decrease in size from the outer quill. A very close inspection, however, will show that while the distinct emargination at the tip of the inner web of these remiges in *T. colubris* and *T. alexandri* is wanting, there is an indication of the tooth-like projection just anterior to the end of the web. In fact, *T. alexandri* is very nearly intermediate in this respect between *T. violajugulum* and *T. colubris*, though nearest the latter.

The female has the outer tail feathers somewhat lanceolate, as in the male, though much broader. They are broad to the terminal third, where they become rapidly pointed, the tip somewhat rounded; the sides of this attenuated portion (one or other, or both) broadly and concavely emarginated, which distinguishes them from the females of *Selasphorus* and *Calypte*, in which the feathers are broadly linear to near the end, which is much rounder and without any distinct concavity.

The genus *Trochilus*, as here restricted, includes three species, all belonging strictly to North America, though like many other Nearctic birds they winter chiefly within the tropics. One is eastern, the other two western, in distribution, one of the latter being, so far as known, very local in its range.

The three species agree in the following characters of coloration: Upper parts, including top of head, metallic greenish, varying from nearly pure green to bronzy; median lower parts whitish, the sides metallic green; adult males with a portion of the gorget brilliantly metallic red, rose-purple or violet, the anterior portion velvety black; tail-feathers (except middle pair) uniform purplish black. *Adult females* and *young* with chin and throat dull whitish, or pale grayish (sometimes spotted centrally with the metallic color of the male), the rec-

trices (except middle pair) greenish basally, black subterminally, and tipped with white.

They may be distinguished by the following characters:

*a*¹. Adult males with chin only and a line thence along anterior lateral edge of gorget opaque black, the remainder of the gorget reddish.

*b*¹. Gorget fiery metallic crimson or ruby-red, changing to golden red. *Hab.* eastern North America. *T. colubris* LINN. *Ruby-throated Humming Bird.* (Page 327.)

*b*². Gorget auricula-purple. *Hab.* Santa Barbara, California.

T. violajugulum JEFFRIES. *Violet-throated Humming Bird.* (Page 329.)

*a*². Adult male with more than upper half of gorget opaque black. Lower part of gorget metallic violet. *Hab.* western North America.

T. alexandri BOURC. and MULS. *Black-chinned Humming Bird.* (Page 331.)

✓ RUBY-THROATED HUMMING BIRD. *Trochilus colubris* LINN.

(Plate XXXVII.)

Trochilus colubris LINN., S. N. ed. 10, I, 1758, 120.—WILS., Am. Orn. II, 1810, 26, pl. 10, figs. 3, 4.—NUTT., Man. I, 1832, 588.—AUD., Orn. Biog. I, 1832, 348; v, 1839, 544, pl. 47; Synop. 1839, 170; B. Am. IV, 1842, 190, pl. 253.—GOULD, Mon. Troch. III, 1861, pl. 131.—B. B. and R., Hist. N. Am. B. II, 1874, 448, pl. 47, fig. 2.

Trochilus auricularis LAWR., Ann. Lyc. N. H. N. Y. VII, Feb. 1862, 458.

Northern Humming Bird (SWAINSON).

Red-throated Humming Bird.

L'Ornismya petit rubis (MULSANT and VERREAUX).

Chupamirto rubi (FERRARI-PEREZ).

Chupamirto color de fuego (D'OCA).

RANGE.—In summer, the whole of temperate eastern North America, north in the interior, to latitude 59°, west to the Great Plains. In winter, from southern Florida (Punta Rassa, Key West, etc.), Bahamas, Cuba, Porto Rico, and eastern Mexico through Central America as far as Veragua; Bermudas.

SP. CHAR.—*Adult male*: Chin, and a line thence backward to beneath the eye, opaque velvety black, the rest of the gorget intense metallic crimson, changing to golden red; tail forked for about 0.30–0.35; length about 3.07–3.75, wing 1.60, tail 1.25, exposed culmen 0.55–0.65. *Adult female*: Tail double-rounded, the outer feathers about as long as middle pair (sometimes a little shorter), the middle pair wholly green, the rest green basally, then black, the three outer pairs broadly tipped with white; length about 3.50–3.90, wing 1.80, tail 1.20, culmen 0.70. *Young male*: Similar to adult female, but throat streaked with dusky, feathers of upper parts more or less distinctly margined with pale buffy, and tail more forked. *Young female*: Similar to young male, but throat without streaks, and tail more rounded.

Adult male (No. 2713, Washington, District of Columbia, 1843; S. F. Baird): Above metallic bronze-green, becoming darker and duller on top of the head, where the metallic gloss almost disappears on the forehead—the green brightest on rump, upper tail-coverts, and middle pair of tail-feathers; remiges dull slate-blackish, with a faint purplish gloss; tail-feathers (except middle pair) darker and with more distinct

purple gloss. A small white spot at posterior angle of eye; lores, chin, and stripe beneath eyes, on each side of gorget, and extending nearly to the end of the same across ear-coverts, velvety opaque black; rest of gorget intensely bright metallic crimson or ruby-red, changing to brassy or golden and even greenish in certain lights. Chest dull grayish white, the median line of the breast and belly similar, but darker; sides and flanks deep sooty-grayish strongly glossed with bronze-green; under tail-coverts light grayish brown or brownish gray broadly margined with dull whitish. Bill wholly black; feet blackish. Length (skin), 3.15*; wing, 1.60; tail, 1.20, the middle feathers 0.30 shorter; exposed culmen, 0.60.

Adult female (No. 1101, Washington, District of Columbia, 1843; S. F. Baird): Above, similar in color to the male; tail-feathers, however, except two middle pairs, tricolored, the basal portion bronze-green, tips white, and intermediate portion black, the white broadest (about 0.30 of an inch along shaft) on outer feather, the black nearly the same width (about 0.35 along shaft) on all, the fourth feather tipped with black for about 0.25 of an inch. Chin, throat, belly, and under tail-coverts dull white,† chest pale grayish, sides and flanks deeper grayish, slightly tinged with brown. Bill black, feet dusky. Length (skin), 3.30; wing, 1.80; tail 1.05, middle feathers 0.10 shorter; exposed culmen, 0.65.

Young male (No. 84118, Mount Carmel, Illinois, August 17, 1870; R. Ridgway): Similar to the adult female, but upper parts less bronzy, the feathers indistinctly margined terminally with pale grayish buffy (observable only in certain lights); basal portion of tail-feathers much duller green. Lower parts as in adult female, but chin and throat narrowly streaked with brownish dusky, and sides and flanks more strongly tinged with buffy brown. Length (skin), 3.05; wing, 1.65; tail, 1.10, the middle feathers 0.95; exposed culmen, 0.65.

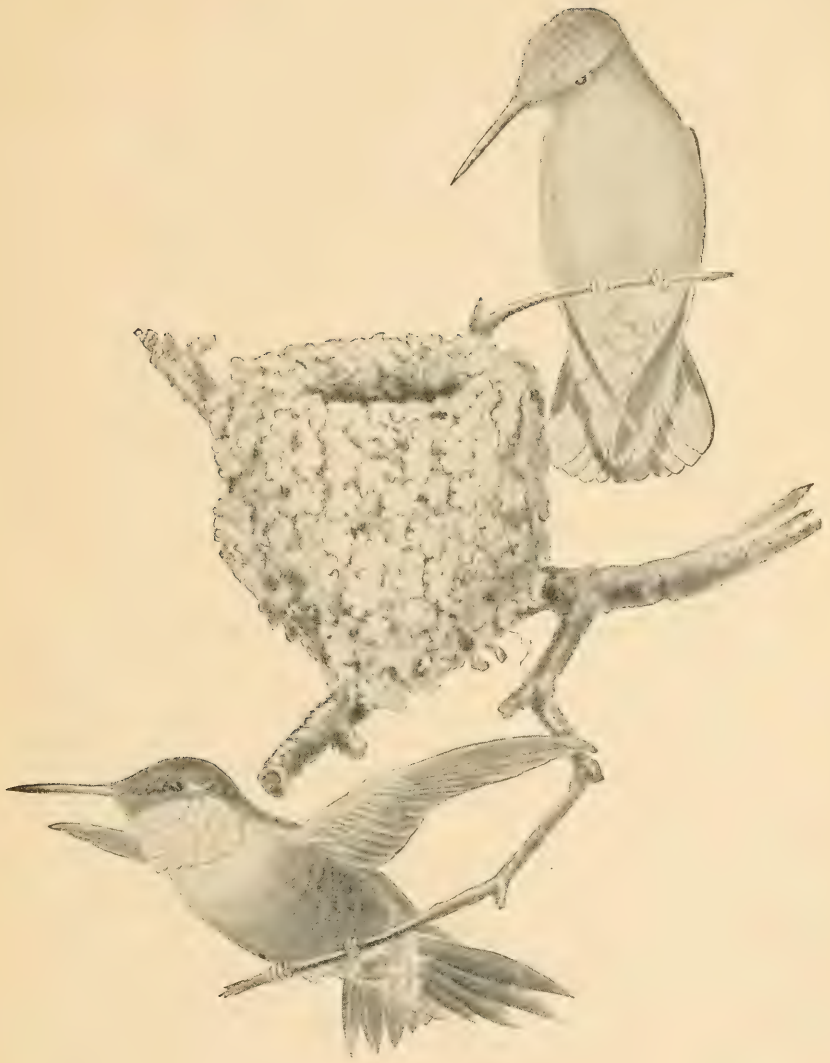
Young males begin to show the metallic-red feathers of the gorget the first winter or late during the first autumn, the tail at the same time remaining the same as described above. Some specimens have the dusky streaks on the throat broader than in the specimen described above, forming small oval or oblong spots instead of streaks.

In adult males there is little variation in color, except that the hue of the green above varies, as in other species, from a decided bronze to a clear bottle-green, the average tint being intermediate between the two, and the color always most decided on the upper tail-coverts and middle tail-feathers. The color of the throat is sometimes more scarlet (much the same as in *Selasphorus rufus*), and there is also some difference in the color of the lower parts, some specimens being darker than others.

In adult females there is the same variation in the color of the upper

* The length of the adult male before skinning is about 3.50-3.75.

† In this particular specimen adventitiously stained with brown on chin and throat.



RUBY-THROATED HUMMING BIRD (*Trochilus colubris*).

Male. (Cat. No. 88130, U. S. N. M. Stamford, Connecticut. Collected and presented by Dr. R. W. Shufeldt, U. S. A.)

Female. (Cat. No. 29287, U. S. N. M. Xalapa, Mexico. Collected by R. Montes de Oca.)

Nest. (Cat. No. 23286, U. S. N. M. Sing Sing, New York. Collected and presented by Dr. A. K. Fisher.)

parts as in the male, and lower parts are more decidedly white in some specimens than in others; in others again, but chiefly (?) in autumnal birds, the flanks are more or less strongly tinged with rusty. Very rarely (?) is there any dusky streaking on the chin and upper throat, and never (?) is this so decided as is often seen in females of *T. alexandri*.

Little need be said as to the habits of this well-known Humming Bird. Its distribution is general over every portion of the continent from the Great Plains to the Atlantic coast and from Canada to the Gulf of Mexico. Arriving among us when spring is fairly established and departing just before the first autumnal frosts, these creatures traverse a distance in their migrations that appears almost impossible to creatures so minute, many individuals making their winter homes as far south as Veragua, in the State of New Granada, immediately north of the Isthmus of Panama. A considerable number pass the winter as far north as southern Florida, and a few have been seen during the same season in southern Texas.

The nest is a beautiful cup-shaped structure ornamented externally with a mosaic of bits of lichen and warmly lined with plant-down. The eggs average about 0.50 by 0.30 of an inch.

VIOLET-THROATED HUMMING BIRD. *Trochilus violajugulum* JEFFRIES.

(Plate XXXVIII, Fig. 2.)

Trochilus violajugulum JEFFR., Auk, v, No. 2, April, 1888, 168; *ib.*, July, 1889, 223.

RANGE.—Southern California (vicinity of Santa Barbara).

SP. CHAR.—Most like *T. alexandri*, but larger, with gorget much more extensively metallic and much more reddish purple in color; tail much longer and more deeply forked, with outer feather relatively narrower and more pointed.

Adult male (No. 1616, coll. Dr. J. Amory Jeffries, Santa Barbara, California, May 4, 1883): Pileum dull dusky green—almost black when viewed from in front, more metallic from behind; rest of upper parts, except remiges and rectrices (but including middle pair of the latter), bronzy green; remiges and primary coverts dull purplish dusky; tail (except middle pair of feathers) dull black, the feathers tinged at tips with metallic green. A small white spot behind eye. Chin and a rather indistinct stripe thence backwards beneath eye and along upper margin of gorget opaque dull black; gorget metallic, auricula purple* (much less violaceous than in *T. alexandri*), the posterior

* See the author's Nomenclature of Colors (Little, Brown & Co., Boston), pl. VIII, fig. 3.

In describing the color of the gorget in Humming Birds some allowance should be made for individual variation. Taking a considerable number of specimens of four of the North American species (*Trochilus alexandri*, *Calypte costae*, *Atthis heloisa*, and *Calothorax lucifer*), the color of the gorget varies so much that it is possible to find specimens of the four species which are so nearly alike in this respect that what little difference may exist can scarcely be described. The average difference, however, is very decided, and there is more difference in the degree of brilliancy of the surface

and lateral feathers not lengthened; chest dull grayish white; rest of under parts dull light bronzy green, nearly uniform on sides and flanks, elsewhere broken by whitish margins to the feathers, these particularly distinct on the lower tail-coverts and along middle line of the belly. Bill black, feet dusky. Length (skin), 3.40; wing, 1.85; tail, 1.30; middle pair of rectrices 0.25 shorter, the lateral one only 0.15 wide in middle portion.*

Whether this bird represents a distinct species or a hybrid between *Trochilus alexandri* and *Calypte anna* or between the former and *Calothorax lucifer* can not now be determined; but there is very little, if anything, in the writer's opinion to give the hybrid theory any weight. In hybrids between species showing very obvious differences of form or coloration, the characters are invariably intermediate between those of the two parents; but only in the shape and coloration of the tail and coloration of the under parts do we see any approach to *C. anna* in those respects which distinguish the present bird from *T. alexandri*. Mr. Jeffries says that "the bird is roughly a *T. anna* without a crown-patch or ruff, and with violet [?] for sapphire [?].† The tail is of the same type as in *T. anna*, but smaller, and the angle spoken of‡ is less than 25° instead of 33°, so that in the closed tail the outer pair of feathers overlap instead of crossing as in *T. anna*."

As to the shape of the lateral rectrices, which Dr. Jeffries compares with that of *C. anna*, I find on very careful comparison that there is no essential difference in this respect between *T. violajugulum* and *T. alexandri*, as the following diagrams (Fig. 47, page 331) will show:

The outer primary, instead of being narrow and slightly curved, as in *Calypte anna*, is broader (though perhaps not relatively so) than in *Trochilus alexandri*, and quite as strongly curved towards the tip.

After a very careful examination of the type, I am able to find a really striking or "suggestive" resemblance to *C. anna* only in the coloration of the under parts, which, except the gorget, is quite the same in the

than in the color itself, while there are also characteristic differences in the variations of color depending on different positions as to the light. Thus *Atthis* has a distinct green reflection in a certain light, whereas *Calypte* and *Calothorax* in the same light show violet-blue. *T. alexandri* is much less brilliant and less changeable, but the individual variation is probably greater, the variation being from the normal violet through blue to a decided blue-green hue in some specimens, though such are rare. In *T. violajugulum* the gorget is a redder purple than in any of the preceding, nearly matching in color the gorget of some examples of *Stellula calliope*, though not quite so red.

* The tip of the bill having been shot away, the length of the culmen can not be given; the length of the bill from the base of the culmen to the tip of the lower mandible, however, is 0.63 of an inch.

† We should as little think of calling the color of the throat in *T. violajugulum* "violet" as we would the rich metallic purple-red of *C. anna* "sapphire."

‡ In Dr. Jeffries description of the outer pair of tail-feathers of *C. anna* these are said to be "abruptly narrow and linear shafts * * * forming, at the junction of the first and second third, an abrupt angle of 25°."



Fig. 1. FLORESI'S HUMMING BIRD (*Selasphorus floresii*) Gould. (From a specimen in the collection of Walter E. Bryant (No. 2620). San Francisco, California.)

Fig. 2. VIOLET-THROATED HUMMING BIRD (*Trochilus violajugulum*) Jeffries. (From the type, in the collection of Dr. J. Amory Jeffries, Boston, Massachusetts.)

two birds; and it seems to me that, in the absence of structural characters, as well as those of coloration (further than the slight one noted), suggesting hybridism between *C. anna* or any other species, *T. violajugulum* may properly be regarded as a distinct species until more decided evidence to the contrary is obtained.

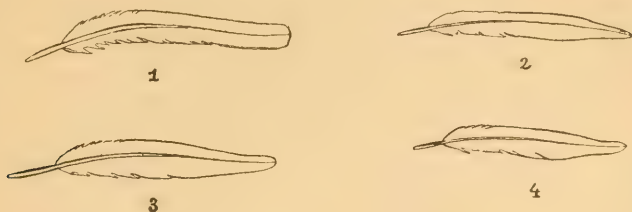


FIG. 47.—Outer tail feathers of (1) *Oalypste anna*, (2) *Trochilus colubris*, (3) *T. violajugulum*, and (4) *T. alexandri*.

BLACK-CHINNED HUMMING BIRD. *Trochilus alexandri* BOURC. and MULS.

Trochilus alexandri BOURC. and MULS., Ann. Soc. d'Agric. de Lyon, ix, 1846, 330.—CASS., Illustr. B. Cal. &c. i, 1854, 141, pl. 22.—GOULD, Mon. Troch. pt. xiv, 1857, pl. 4; vol. iii, 1861, p. 132.—COOPER, Orn. Cal. i, 1870, 353.—B. B. and R., Hist. N. Am. B. ii, 1874, 450, pl. 47, fig. 1.

Alexandre's Humming Bird.

Purple-throated Humming Bird (GOULD, CASSIN).

L'Ornismye d'Alexandre (MULSANT and VERREAUX).

Chupamirto de pecho morado (D'OCA).

RANGE.—Western United States, between Rocky Mountains and Pacific coast; east to central Texas and Uintah Mountains, Utah; north to latitude 49°, in British Columbia, between Cascade and Rocky Mountains; breeding as far south as Guaymas, Sonora; wintering in western, central, and southern Mexico.

SP. CHAR.—*Adult male*: Chin and throat opaque velvety black, bordered below by a broad band of metallic violet, changing to green and blue; tail slightly forked or emarginated (depth of fork only about 0.10 of an inch); length about 3.30–3.75, wing 1.70–1.75, tail 1.20–1.25, culmen 0.70–0.75. *Adult female*: Tail much rounded, the middle feathers about the longest; plumage not essentially different from that of female *T. colubris*; length about 3.90–4.10, wing 1.90–2.00, tail 1.20–1.35, culmen .78–.90. *Young*: Similar to adult female, but feathers of upper parts margined terminally with light buffy or pale rusty, the male with throat streaked with dusky.

Adult male (No. 117256, Pinal County, Arizona, April 9, 1885; W. E. D. Scott): Above very dull bronze-green, the top of the head more dusky and quite destitute of metallic gloss on forehead; remiges dusky slate, slightly glossed with purple; rectrices (except middle pair) purplish black, margined terminally with dull bronze-green, this most extensive on lateral feathers. A small white spot behind eye. Chin, upper half of throat (for about .45 of an inch from point of chin), sub-orbital region, and ear-coverts, opaque velvety black; lower part of

throat metallic violet, but slightly changeable, forming a transverse band about .22 of an inch wide; chest dull white; median line of breast and belly light grayish brown, the feathers margined with grayish white; sides and flanks dull bronze-green, the feathers narrowly margined with pale grayish or grayish white; under tail-coverts dull brownish bronze centrally, broadly margined with white. Bill and feet black. Length (skin), 3.40; wing, 1.72; tail, 1.20, the middle feathers 0.20 shorter; exposed culmen, 0.80.

Adult female (No. 117263, Pinal County, Arizona, April 14, 1885; W. E. D. Scott): Above dull metallic bronze-green, passing on top of head into dull grayish brown, the feathers with paler margins; remiges dull slate-dusky, glossed with purplish on the terminal portion. Middle pair of tail-feathers entirely bronze-green; rest bronze-green basally, then purplish black, the tip of the outer three white, the latter broadest on exterior feather, as is also the black; fourth feather with a small terminal spot of bronze-green. A small white spot behind eye; ear-coverts dull gray; chin, malar region and upper median portion of throat white; sides of throat, with chest and sides of neck, pale gray; median line of breast, whole belly, anal region, and under tail-coverts, white; sides and flanks white, tinged with pale grayish and light rufous. Bill and feet black. Length (skin), 3.65; wing, 2.00; tail, 1.20, middle feathers 0.08 shorter; exposed culmen, 0.90.

Young male (No. 117266, Pinal County, Arizona, July 8, 1884; W. E. D. Scott): Similar to streaked-throated adult females, but feathers of the upper parts distinctly margined with dull buff, and remiges without purplish gloss.

Young female: Not appreciably different from the young male.

In adult males there are the same general variations in color as are noticed under *T. colubris*; but the color of the lower throat varies much more than in that species, the variation being towards blue, some specimens showing even a green hue on at least the exposed portion of some of the feathers.

Adult females vary chiefly as to the chin and throat, which are usually plain white or grayish white, but frequently more or less distinctly streaked with dusky, even in spring and breeding specimens. Others, again, even breeding birds, have a distinct rusty tinge or suffusion on the flanks, as in *T. colubris*. Very rarely (as in No. 98440, Red Bluff, California, May 12, 1884, C. H. Townsend), the middle tail-feathers are blackish at their tips for a considerable distance.

While the range of this species within the United States is quite extensive, its distribution is irregular. According to Mr. Belding it is apparently rare or local in central California, although common along the Sacramento and San Joaquin Rivers, while it winters entirely south of that State, not having been met with by him during the winter even in the Cape district of Lower California. Mr. W. E. D. Scott*

* The Auk, Oct. 1886, p. 430.

found it to be a "common summer resident in the Catalina Mountains, where it breeds very commonly. Arrives early in March, and is abundant by the last of that month. By the last of April the birds are mated and begin breeding; and I have found nests with fresh eggs late in July and early in August. By the 10th of October they have all left the region in question." He found it to be of uncommon occurrence above an altitude of 7,000 feet, but it was common and breeding at Fort Lowell, "which is north of Tucson and lies at about the same altitude," though about the latter place Mr. Herbert Brown regards it as rare, and has not found it breeding.

The black-chinned Humming Bird has not yet been found as far to the eastward in the Rocky Mountain district as *Selasphorus platycercus* and *S. rufus*, the Uintah Mountains, Utah, being the easternmost limit recorded. In these mountains the present writer found it rather common in July, 1869, while it was also fairly common in the Wahsatch Mountains and in the vicinity of Salt Lake City.

Its habits are essentially the same as those of the Ruby-throat.

Genus **CALYPTE** GOULD.

Calypte GOULD, Introd. Troch. Oct. ed. 1861, 87. Type, *Ornismya costæ* BOURC.

Leucaria MULSANT, Cat. des Ois. Mouch. 1875, 29. Type, *Ornismya costæ* BOURC.

GENERIC CHARACTERS.—Adult males with the top of the head brilliantly metallic (red, purple, or violet), like the gorget, with its elongated lateral ruff-like extensions, and the tail emarginated or slightly forked, with the outer pair of feathers abruptly narrower than the rest (except in *C. helenæ*), and destitute of white or rufous markings; adult females with outer tail feathers decidedly narrower than the next, but with broad rounded end, and without any rufous.

In this genus, or subgenus, the primaries are nearly intermediate in form between those of *Trochilus* and those of *Selasphorus*, though much more like the former. The males are very easily distinguished by the characters given above from those of both the other genera mentioned; but the females are so much like those of the species of *Trochilus* in both form and coloration that size alone is the easiest way to distinguish them—that of *C. costæ* being smaller, while that of *C. anna* is larger than the female of either species of *Trochilus*. From the females of any species of *Selasphorus*, as well as from that of *Atthis*, those of *Calypte* may be distinguished by the entire absence of any rufous on the tail.

Of the known species, two belong to California and northwestern Mexico and one to Cuba, the latter being aberrant in some parts of its structure as well as coloration, and perhaps entitled to subgeneric if not generic separation. It is the smallest of all Humming Birds, being considerably less than the Vervain Humming Bird of Jamaica and Hayti (*Mellisuga minima*), which hitherto has enjoyed the distinction of being least among birds.

The three species of *Calypte* may be distinguished by the following characters :

- a¹. Wing not less than 1.70; upper tail-coverts and middle tail-feathers bronze-green; outer tail-feather of male much narrower than the next.
- b¹. Tail 1.15 or more (1.30–1.45 in the male); *adult male* with gorget and top of head metallic purplish red; *adult female* dull light brownish gray beneath. *Hab.* : California, resident, a few migrating to Arizona and northern Mexico in winter. *C. anna* (LESS.). *Anna's Humming Bird*. (Page 334.)
- b². Tail not more than 1.10 (still shorter in female); *adult male* with gorget and top of head metallic violet; *adult female* with under parts white. *Hab.* : Western Mexico, Arizona, Lower California, and southern California. *C. costæ* (BOURC.). *Costa's Humming Bird*. (Page 337.)
- a². Wing not more than 1.15; upper tail-coverts and middle tail-feathers metallic blue or greenish-blue; outer tail-feather of male not narrower than the next. *Adult male* with gorget and top of head metallic purplish red (as in *C. anna*); *adult female* with anterior half of lower parts pale ash-gray, posterior half white. *Hab.* : Cuba. *C. helenæ* (GUNDL.). *Princess Helena's Humming Bird*.*

ANNA'S HUMMING BIRD. *Calypte anna* (LESS.).

Ornismya anna LESS., Ois. Mouch., 1829, 205, pl. 74.

Trochilus anna JARD., Nat. Libr. Humming B., I, 1833, 93, pl. 6.—AUD., Orn.

Biog. v, 1839, 438, pl. 425 : Synop. 1839, 170; B. Am. IV, 1842, 1-8, pl. 252.

Calypte annæ GOULD, Mon. Troch., pt. XI, 1856, pl. 5; vol. III, 1861, pl. 135.—

COOP. Orn. Cal. I, 1870, 358.—B. B. and R., Hist. N. Am. B. II, 1874, 454, pl.

47, fig. 7.

Red-headed Humming Bird.

Anna's *Calypte* (GOULD).

Chupamirto de cabeza y cuello escarlata (D'OCA).

Le *Calypte* d' Anna (MULSANT and VERREAUX).

Oiseau-Mouche Anna (LESSON).

RANGE.—California, resident in warmer portions; performs a partial migration south through Arizona to table-lands of Mexico; south in Lower California as far as Cerros Island.

SP. CHAR.—*Adult male* : Entire head (except occiput), including ruff, brilliantly metallic purplish red; length about 3.40–3.75, wing 1.90–2.00, tail 1.30–1.45, exposed culmen 0.65–0.70. *Adult female* : bronze-green above, including top of head, the latter sometimes dull grayish brown, with little if any metallic gloss; throat pale gray or grayish white, the feathers with darker central spots, often mixed with spots of metallic crimson; length 3.80–4.15, wing 2.00–2.05, tail 1.15–1.30, exposed culmen 0.70–0.75.

Adult male (No. 84123, Marin County, California, February 15, 1877; C. A. Allen) : Entire head (except occiput), including gorget, with its elongated latero-posterior feathers, forehead, crown, and post-ocular region, rich, brilliant, metallic purplish red, or rose-red, with more purplish, and in certain lights somewhat golden or bronzy, reflections; occiput, hind neck, back, scapulars, wing-coverts, rump, upper tail-coverts, and middle pair of tail-feathers metallic bronze-green; remiges

* *Orthorhynchus helenæ* GUNDL. LEMB., Aves de la Isla de Cuba, 1850, 70, pl. 10, fig. 2.—*Calypte helenæ* GOULD, Mon. Troch. III, pl. 136.

dusky, with very faint purplish gloss; tail-feathers (except middle pair) dull purplish black, with inner webs chiefly pale brownish gray, the pair next to the middle ones strongly tinged or washed with metallic green. A minute white spot immediately behind eye. Chest pale brownish gray, the feathers with still paler (grayish white) terminal margins; sides and flanks rather dull metallic bronze-green, inclining to olive in some lights, the feathers indistinctly margined with pale brownish gray; median line of breast and belly similar, but paler on account of greater width of the pale grayish margins; downy tufts between rump and flanks pure white; under tail-coverts white with a central longitudinal space of grayish olive glossed with green. Bill and feet black. Length (skin), 3.75, wing 2.00, tail 1.40 (middle feathers 0.25 shorter), exposed culmen, 0.68.

Adult female (No. 6052, San Francisco, California, winter 1853-'54; Dr. R. D. Cutts): Whole top of head metallic bronze-green, less bright than the back and becoming much duller on forehead; upper parts otherwise as in the male, except three outer tail-feathers, the first of which is dull brownish white at tip (for about 0.25 of an inch on outer web), then black (for about 0.30 of an inch), the basal portion light grayish brown; second feather with whitish tip smaller and black subterminal space larger, the basal portion chiefly metallic green; third with only a very narrow terminal edging of white, but otherwise like the second; fourth with merely a blackish spot near tip of each web, on edge, that on outer web reaching almost to the shaft. Lower parts as in the male, but malar region, chin, and throat pale brownish gray, the middle of the latter spotted with metallic red, the ear-coverts grayish brown. Bill and feet black. Length (skin), 3.80; wing, 2.05; tail, 1.15 (the outer feathers 0.05 shorter); exposed culmen, 0.70.

Young male: Similar to the adult female, but tail different, the whitish tips and blackish subterminal spaces of the two outer feathers being much less distinct. Autumnal specimens show metallic red feathers, mixed with the first plumage, on crown and throat.

Young female (No. 79671, Tejon Mountains, California, August 19, 1875; H. W. Henshaw): Similar to the adult female, but feathers of upper parts, particularly on those of rump and the upper tail-coverts, very narrowly margined at tips with pale grayish buffy.

Adult males vary somewhat in the color of the crown and throat, some being more purplish red than others. One (No. 5501, Petaluma, California, E. Samuels), has the crown glossed with steel-blue in certain lights.

Females with metallic feathers on the throat seem to be the rule rather than the exception in this species; at least, of the 11 specimens now before me, 8 have the throat thus ornamented, though the extent of the metallic red spotting varies greatly.

Perhaps the most beautiful of North American Humming Birds, this species, named by M. Lesson after Mme. Anna, Duchesse de

Rivoli, is one of the most abundant of those occurring in the State of California, where it remains throughout the year. Its distribution within that State is pretty general, though it is said to be much less frequent in the low valleys than in the mountains in summer, probably on account of the comparative scarcity of flowers. At San Diego it is said to be more numerous in winter than in summer, as is probably the case in other parts of southern California. Mr. Belding did not find it in Lower California farther south than Cerros Island, where he took a single specimen in April. Those individuals which pass beyond the United States during their winter migration appear to go to northern Mexico by way of Arizona, Mr. Henshaw having found it common in the vicinity of Camp Grant from September 24 to 27, 1873. Mr. Scott, however, found it so rare in that Territory that he met with but a single specimen, which he took on October 1, 1883, in the Catalina Mountains, at an altitude of 5,000 feet, and he says * that Mr. Herbert Brown has no record of its occurrence about Tucson at any season.

At the place where Mr. Henshaw found them they were "by no means rare," as he saw in the neighborhood of 20 during the four days which he spent in collecting there. "They were always seen in the immediate vicinity of the creeks, where only at this late season there remained a few of the bright flowers about which they were seen hovering. Their large size rendered them very conspicuous among the other species, and as if aware of this they were much the shyest of all."†

I have referred above to the beauty of this species, a fact which seems to have impressed Mr. Gould also, judging from the following, from Vol. III of his Monograph of the Trochilidæ (p. 135):

When studying the diversified forms and coloring of the Trochilidæ, I have frequently been struck with the fact that those districts or countries having a metaliferous character are tenanted by species of Humming Birds which are more than ordinarily brilliant and glittering. This is especially the case with the species inhabiting Mexico and California: in illustration of this assertion, I may cite the three California species, *Scelasphorus rufus*, *Calypte costæ*, and the present bird, *C. annæ*, all of which are unequalled for the rich metallic brilliancy of certain parts of their plumage, by any other members of the family. The two latter, *C. costæ* and *C. annæ*, have not only the throat, but the entire head as glitteringly resplendent as if they had been dipped in molten metal.

For a very interesting account of the nesting habits of *Calypte annæ*, the reader is referred to an article, headed "Notes from California," in the Ornithologist and Oologist, Vol. VII, p. 139.

* The Auk, October, 1886, p. 431.

† Report on Ornithological Specimens, Wheeler's Exp., 1873, pp. 130, 131.

COSTA'S HUMMING BIRD. *Calypte costae* (BOURC.).

(Plate XXXIX.)

Ornismya costae BOURC., Rev. Zool. 1839, 294.*Calypte costae* GOULD, Mon. Troch. pt. XI, 1856, pl. 7; vol. III, 1861, pl. 134.—Coop., Orn. Cal. I, 1870, 360.—B. B. and R., Hist. N. Am. B. II, 1874, 457, pl. 47, fig. 8.Costa's *Calypte* (GOULD).

La Leucaire de Costa (MULSANT and VERREAUX).

Oiseau-Mouche de Costa (BOURCIER).

Chupamirto de gola y cabeza violada (D'OCA).

RANGE.—Southern California, Lower California, Arizona, and western Mexico.

SP. CHAR.—*Adult male* with top of head, gorget and ruff brilliantly burnished metallic violet, changing to royal purple, blue, and sometimes even to green in certain lights; length about 2.75–3.20, wing 1.75–1.90, tail about 1.10, exposed culmen, 0.65–0.68. *Adult female* with top of head dull grayish brown anteriorly, changing to bronze or bronze-green posteriorly, like color of back, etc.; chin and throat grayish white, sometimes spotted with metallic violet; basal portion of lateral tail-feather pale grayish brown; length about 3.55–3.70, wing 1.70–1.80, tail 1.05, exposed culmen 0.65–0.70.

Adult male (No. 99215, Tucson, Arizona, March 18, 1884; E. W. Nelson): Whole top of head, chin, throat, ear-coverts and much elongated feathers (extending nearly 1 inch from chin-angle) on side of throat richly burnished metallic violet, changing to royal purple and blue in different lights; rest of upper parts, except remiges, bronze-green; remiges dusky slate, faintly glossed with purplish; tail (except middle pair of feathers) grayish dusky glossed with green, this more distinct toward middle feathers, the inner web of outer feather considerably paler, and the three outer feathers darker near tip. A small white spot behind eye. Lower foreneck and chest white; sides and flanks deep metallic bronze green; median line of breast and belly pale grayish or dull grayish white; silky tufts between rump and flanks, pure white; under tail-coverts bronze-green centrally, white around margins. Bill and feet black. Length (skin) 3.15, wing 1.75, tail 1.05, middle feathers 0.15 shorter, exposed culmen 0.68.

Adult female (No. 99216, Tucson, Arizona, May, 1884; E. W. Nelson): Top of head dull light brownish gray, passing on occiput into dull metallic bronze green and this into lighter bronze-green on back, scapulars, wing coverts, rump, upper tail-coverts, and middle pair of tail-feathers; the feathers of the back, etc., showing, in certain lights, very indistinct terminal margins of pale buffy grayish; remiges dull brownish slate, very faintly glossed with purplish; rectrices next to middle pair metallic bronze-green, broadly tipped with black; next pair similar, but black much more extensive and the tip white (for about .05 of an inch); next pair with white tip much wider, and the basal portion green only next to the black band, the remaining part pale brownish

gray; outer pair similar but with basal portion wholly pale brownish gray, and the white tip slightly longer (extending about .20 of an inch from tip). A small white spot behind eye; beneath this an oblique patch of brownish gray, extending from lower eyelid across ear-coverts and gradually fading into the white of the throat; chin, throat, breast, belly, and under tail-coverts dull white; feathers of sides and flanks pale bronze-green, broadly margined with pale buffy grayish or brownish white. Bill and feet black. Length (skin) 3, wing 1.80, tail 0.95 (outer feathers 0.10 shorter), exposed culmen 0.65.

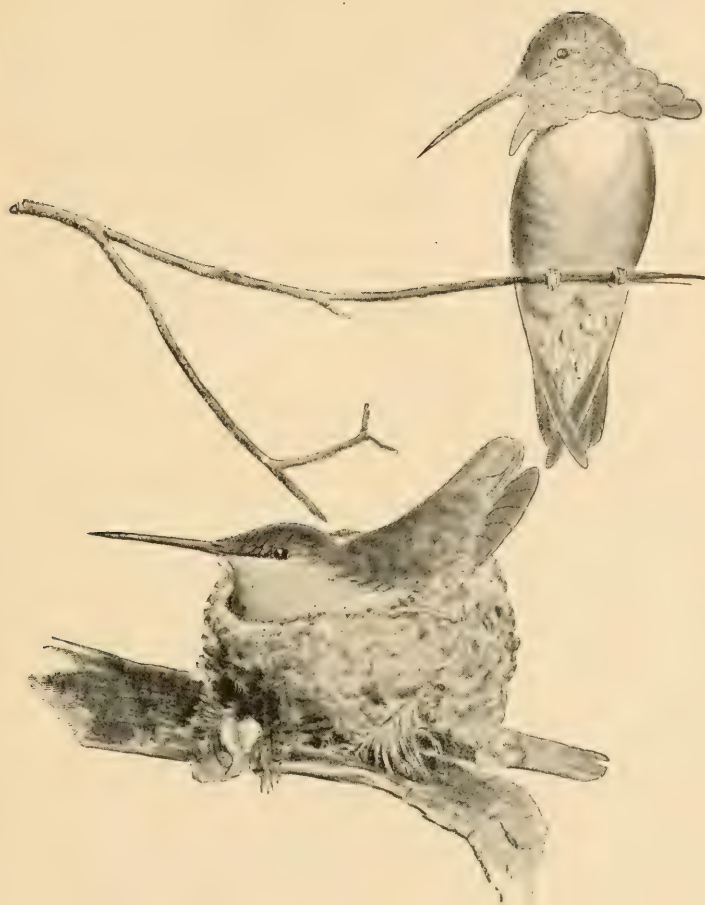
Young male (No. 99369, Santa Rita Mountains, Arizona; E.W. Nelson). Much like the adult female; as described above, but top of head dull, faintly metallic, bronze-green, like back, etc., and all the feathers of upper surface of head and body distinctly margined terminally with pale grayish buff, this most conspicuous on rump; rectrices with both the white tips and black subterminal spaces less extensive, and basal portion of outer feathers faintly glossed with green; oblique patch from beneath eye and across ear-coverts much darker; posterior part of sides of throat spotted with dusky grayish brown, the more anterior portion and chin marked with much smaller and paler spots; middle of throat metallic violet.

Young female (No. 117281, Pinal County, Arizona, May 27, 1885; W. E. D. Scott): Like the young male, as described, but entire throat, with chin, immaculate white, shading into pale brownish gray on sides of neck; forehead and crown pale brownish gray, the feathers with small central spots of darker; tail much as in adult female.

Adult males vary somewhat in the changeable reflections of the crown and ruff, which usually varies from a pure magenta or aster purple, through violet, to light steel blue, with occasional greenish tints, according to the position in which the bird is held, some specimens showing the blue and green reflections more strongly than others. In one example, a "mummied" skin from San Quentin Bay, Lower California (No. 96615, May 9, 1880, L. Belding), a portion of the crown and the tips of some of the ruff feathers are permanently or unchangeably bright green; but possibly this may be the result of contact with the carbolic acid with which the specimen was preserved. There is also a good deal of variation in the distinctness of the markings on the under tail-coverts, some specimens having the central portions of these feathers very faint grayish, others very deep bronze or bronze green.

Some adult females show metallic violet, bluish, or bluish green feathers on the middle of the throat, but usually these are altogether absent.

This beautiful Humming Bird, named by M. Bourcier in honor of M. le Marquis Costa de Beauregard, is also an inhabitant of California, but unlike *C. anna* is of very limited distribution in that State. According to Dr. Cooper it has been taken as far north as San Francisco, but it is probably only a straggler there, and it is said to be very rare in Ventura County. It is common during summer in the cañons of the San



COSTA'S HUMMING BIRD (*Calypte costae*).

Male. (Cat. No. 117272, U. S. N. M. Pinal County, Arizona. Collected by W. E. D. Scott.)

Female. (Cat. No. 117272, U. S. N. M. La Paz, Lower California. Collected and presented by L. Belding.)

Nest. (Cat. No. 18542, U. S. N. M. La Paz, Lower California. Collected and presented by L. Belding.)

Bernardino foot-hills, and breeds also on the Colorado Desert, where its nest was found by Mr. F. Stephens as early as March 18. It winters abundantly in the Cape district of Lower California, but none are said to winter so far north as San Diego. It breeds in the Cape district, but is much less common there in summer than in winter. In southern Arizona it occurs abundantly during its migrations, and also breeds in those localities, which seem specially adapted to it.

Says Mr. W. E. D. Scott*:

In 1884 I did not meet with the birds in the Catalinas till late in July, and then only sparingly. But in 1885, in the same locality, the birds were very common by April 5, particularly the males, in the most gorgeous plumage. The absence of adult females for the next six weeks was very noticeable. I think I took only three, though the males were common all the time. About the 20th of May young birds of the year began to be abundant, and adult birds of either sex were difficult to find. The young birds were common all through June; I could often count twenty near my house; but after June 1 I was unable to get any adult birds of either sex. I do not think the birds bred in the Catalinas, but think that probably they did breed in numbers on the San Pedro River.

Two nests of this species, collected at La Paz, by Mr. Belding, are quite different in size and shape. Both are ordinary looking structures, composed of dull gray lichens and small pieces of thin bark, held together with spiders' webs, the interior containing a few soft small feathers, in one nest apparently of the summer yellow bird (*Dendroica aestiva*). The larger nest measures about $1\frac{1}{2}$ inches in diameter by a little more than 1 inch in depth, the cavity being about 0.1 by 0.80; the smaller one measures about the same in diameter across the top, but is much narrower at the bottom, is less than 1 inch high, and has a shallower cavity with much thinner walls. Each contains a single egg, one measuring 0.30 by 0.50, the other 0.32 by 0.50. The identification is positive, the parent bird accompanying each nest. One of these females has a very large spot or patch of metallic violet on the throat, while the other has instead only a few dusky specks.

GENUS SELASPHORUS SWAINSON.

Selasphorus SWAINS., Fauna Bor.-Am. II. 1831, 324, and 496. Type, *Trochilus rufus* GMEL.

GENERIC CHARACTERS.—*Adult males* with the tail-feathers partly rufous, the outer primary narrow and pointed (except in three of the Central American species†), and the tail more or less graduated, with some of the feathers, at least, more or less pointed; top of head greenish, or at least not similar in color to the gorget (except in *S. floresii*).

The species of this genus, or subgenus, differ so much among themselves in points of structure that I am not able to give any better diag-

* The Auk, Oct., 1886, p. 431.

† *S. torridus* SALV., *S. ardens* SALV., and *S. flammula* SALV., have the tip of the outer primary rounded.

nosis than the above. The typical species are easily recognized, so far as the males are concerned, by the narrow and pointed outer primary, all of the northern species possessing this character, while one of the southern species (*S. scintilla*) does also; while as to coloration, the males of all are characterized by a greater or less amount of rufous, *longitudinally* disposed, on at least some of the tail-feathers. The tail is more or less graduated or wedge-shaped, except in *S. platycercus*, in which six middle feathers are about equal in length, the two outer pairs, successively, decidedly shorter. All have a more or less brilliant metallic gorget, which in all of the species except *S. platycercus* has the postero-lateral feathers elongated into a conspicuous "ruff." Only *S. floresii* has the top of the head brilliantly metallic (the same color as the throat), thus showing an affinity to the genus or subgenus *Calypte*, which, however, has an emarginate and differently colored tail and very differently shaped outer primary.

It is very difficult to recognize generic or subgeneric characters in the females; but their more graduated tails, with a considerable quantity of rufous on the basal portion of at least three of the rectrices, will distinguish them from the females of any other North American Humming Birds, except *Stellula calliope*, which has the rufous much more restricted as well as paler and duller, and the six middle feathers of somewhat spatulate or pandurate form; and from those of any Mexican genera except *Atthis*, *Doricha*, and *Calothorax*, which, except the first, differ in having a curved bill and short middle tail-feathers.

The female of *Atthis heloisae* is essentially similar to that of some species of *Selasphorus* in the coloration of the tail, but the latter is double-rounded, and the outer primary is much broader.

The known species of *Selasphorus* may be distinguished as follows:

MALES.

- a*¹. Top of the head brilliant metallic red, like the gorget. *Hab.*: Western Mexico; San Francisco, Cal. ?

S. floresii GOULD. *Floresii's Humming Bird*. (Page 341.)

- a*¹. Top of the head greenish, totally different from the color of the gorget.

- b*¹. Middle tail-feathers rufous, with a median streak or stripe of black; gorget brilliant fire-red or metallic scarlet.

- c*¹. Upper parts (except top of head) rufous, sometimes glossed with green on the back. *Hab.*: Western North America, south to Mexico.

S. rufus GMEL. *Rufous Humming Bird*. (Page 343.)

- c*². Upper parts mainly metallic green.

- d*¹. Larger (like *S. rufus*), with upper tail-coverts wholly rufous, *Hab.*: British Columbia to Arizona. *S. allenii* HENSLE. *Allen's Humming Bird*. (Page 347.)

- d*². Smaller (wing only 1.30, culmen less than .50), with upper tail-coverts partly green. *Hab.*: Costa Rica and Veragua.

S. scintilla GOULD. *Sparkling Humming Bird*.*

- b*². Middle tail-feathers merely edged with rufous or (in *S. platycercus*) with no rufous whatever.

* *Trochilus (Selasphorus) scintilla* GOULD, P. Z. S., 1850, 162.

- c¹. Middle tail-feathers edged with rufous; outer primary not attenuated at tip.
 d¹. Middle tail-feathers purplish black with little or no metallic green, this, if present, on outer web only and not extending nearly to the shaft. (Gorget metallic "pomegranate-purple," not very brilliant.) HAB. Veragua and Costa Rica. *S. ardens* SALV. *Blazing Humming Bird*.^{*}
 d². Middle tail-feathers, metallic green, the inner web (only) sometimes partly purplish black.
 e¹. Gorget dull "heliotrope-purple," or dull grayish purple, with silvery or even greenish reflections. HAB. Veragua. *S. torridus* SALV. *Parched Humming Bird*.[†]
 e². Gorget dull lilac-purple or wine-purple. HAB. Costa Rica and Veragua. *S. flammula* SALV. *Flaming Humming Bird*.[‡]
 c². Middle tail-feathers metallic green, without rufous edgings; outer primary attenuated and curved outward at tip; wing, 1.85 or more. (Gorget rose-purple or solferino.) HAB. Rocky Mountain district, south to Guatemala. *S. platycercus* (SWAINS.) *Broad-tailed Humming Bird*. (Page 350.)
- FEMALES.
- a¹. Outer tail-feathers tipped with white.
 b¹. Wing not less than 1.65.
 c². Wing more than 1.90 (2.00-2.10), middle tail feathers without any rufous, and, next feather with merely a slight edging of this color if any. *S. platycercus*.
 c². Wing less than 1.90; middle tail-feathers with more or less of rufous on basal portion, the next feather with basal half or more rufous.
 d¹. Outer tail-feather about .15 wide across middle of black space; wing 1.75-1.80. *S. rufus*.
 d². Outer tail-feather only .10 wide across middle of black space; wing 1.65-1.70. *S. alleni*.
 b². Wing less than 1.65. *S. torridus*.
 a². Outer tail-feathers tipped with light cinnamon-rufous or ochraceous-buff.
 b¹. Middle tail-feathers margined on both webs with cinnamon-rufous; outer tail-feathers with both webs rufous at base.
 c¹. All the tail-feathers except middle pair cinnamon-rufous across both webs at base. *S. scintilla*.
 c². Only three outer tail-feathers cinnamon-rufous across both webs at base. *S. ardens*.
 b². Middle tail-feather with only the outer web margined with cinnamon-rufous; outer tail-feather with only the inner web rufous at base. *S. flammula*.

FLORESI'S HUMMING BIRD. *Selasphorus rubromitratus* RIDGW.

(Plate XXXVIII, Fig. 1.)

Selasphorus floresii GOULD, Mon. Troch. pt. XXIII, Sept. 1, 1861, pl. 10; vol. III, 1861, pl. 139 (nec *Trochilus floresii* BOURC., Rev. Zool. 1846, 316).—BRYANT, Forest and Stream, XXVI, No. 22, July 24, 1886, 426 (San Francisco, Cal.).

Trochilus floresii GRAY, Hand., I. I, 1869, 144 (Subgen. *Selasphorus*).—RIDGW.-MAN. N. Am. B. 1887, 315.—A. O. U., Abridged Check List, 1889, No. 431.1.

Trochilus rubromitratus and *Selasphorus rubromitratus*, RIDGW., Auk, VIII, Jan., 1891, 114. Le Sélaspore de Flores (MULSANT and VERREAUX).

Chupamirto de corona y pecho escarlata (D'OCA).

Floresi's Flame-bearer (GOULD).

^{*} *Selasphorus ardens* SALV., P. Z. S. 1870, 209.

[†] *Selasphorus torridus* SALV., P. Z. S. 1870, 208.

[‡] *Selasphorus flammula* SALV., P. Z. S. 1864, 586.

RANGE.—Southwestern Mexico (Bolanos, State of Oaxaca); accidental near San Francisco, California.

SP. CHAR.—*Adult male* similar in color to *Calypte anna*, but red of the head more scarlet, and tail-feathers largely rufous-chestnut; outer primary much narrower than in *C. anna*, and tail of very different shape, the lateral pair of rectrices being much shorter than the middle pair, instead of the reverse.

Adult male (No. 2620, coll. Walter E. Bryant, San Francisco, California): Whole top of head, except occiput, together with entire chin and throat, including the elongated postero-lateral feathers of the gorget, intense, glowing metallic rose-red, changing to metallic scarlet, especially on chin and upper part of throat; occiput, hind neck, back, scapulars, wing-coverts, rump, and upper tail-coverts metallic bronze-green; remiges dusky, or dull brownish slate, faintly glossed with purplish; middle pair of tail-feathers metallic green (much less bronzy than back, etc.), the outer web broadly edged with rufous-chestnut nearly to the tip, the inner web similarly marked for basal half; next feather chestnut-rufous with a median stripe of purplish-black, this stripe gradually coming to a point before the base of the feather is reached, but in the other direction widening so as to reach the edge of each web about .25 of an inch from the tip; next feather similar, but the black occupying whole width of outer web to a distance of half an inch from the tip, but much restricted on inner web; next feather with the black extending about as far along the edge of the outer web, but not reaching further along the shaft, while on the inner web it follows the shaft no further than .20 of an inch from the tip; outer feather dusky, with shaft chestnut-rufous nearly to the tip and inner web a paler tint of the same for about the basal half. Chest pale brownish gray, paler anteriorly against the lower margin of the metallic gorget; middle line of breast and belly similar; sides and flanks metallic bronze-green, the feathers margined with pale brownish gray; axillars and adjacent smaller under wing-coverts, light chestnut or cinnamon-rufous; femoral downy tufts white; under tail-coverts pale cinnamon-rufous, becoming grayish white on latero basal portion. Bill, black. Wing, 1.70. Tail, middle feathers 1.00, longest feathers (third pair) 1.20, shortest feather (outer pair) 0.95,* exposed culmen 0.65.

The adult male described above agrees exactly with Mr. Gould's description and colored figures except in some minor and unessential points, and since Mr. Gould's description and figures, though from the same specimen, do not agree with one another, it is altogether likely that neither is quite correct. Mr. Gould describes the color of the middle pair of tail-feathers as "green with purple reflexions," and the lateral ones as having the outer webs "purple" and the "inner webs deep reddish buff," but they are not so colored in the plate, which

* The tail being widely spread, these measurements may not be more than approximately correct.

represents the middle pair as green with a continuous broad border of rufous, and the outer pair as uniform purplish dusky, the intermediate feathers being rufous with a narrow median stripe of purplish dusky, expanding into a wedge-shaped space near the tip. The coloration of the tail as represented in the plate agrees very well with that of the San Francisco specimen, except that the latter has the basal half of the inner web of the outer tail-feathers rufous, and lacks the rufous border around the end of the middle feathers, the rufous running out to the edge a little past the middle of the feather, and thus confined to a little more than the basal half. .

This most beautiful Humming Bird is so rare that only two examples have been recorded, while the female is unknown. The history of the type-specimen is thus told by Mr. Gould:

One of the very finest birds in the Loddigesian Collection was presented to the late Mr. George Loddiges by Mr. Flores. The specimen is in the best state of preservation, and the bird must have been killed immediately after its moulting had been completed, when its plumage was in its greatest beauty. It would, indeed, be most difficult, if not impossible, to represent the color of the head and throat by any artistic means at our command. In brilliancy it fully equals that of the freshly moulted males of *Selasphorus rufus*, but differs from that and all the other known species of the genus in having the entire crown, as well as the gorget, of the brightest flame color. In the form and coloring of its tail it is a true *Selasphorus* while the disposition of the colors of the body allies it to *Calypte*.

I have been kindly permitted by Miss Loddiges to take a drawing of the bird, and that lady has also placed in my hands the following note made by her father in reference to this species:

"August 11, 1845. Mr. Flores sent me a most beautiful Humming Bird, which I call *Floresii*. It is from Bolanos, and is nearly allied to *Anna*, but is much more brightly colored; viewed in front, it is scarlet, the sides of the collar are ruby color or crimson, the head is bright ruby color, and the tail is something like that of *platycercus*, but has brown inner webs. Mr. Flores says it is the only one he has ever seen.

The specimen which I have described above was discovered in a taxidermist's shop in San Francisco, California, in 1885, by Mr. Walter E. Bryant, of that city, to whom I am indebted for the pleasure of inspecting it. It had been mounted as a "hat bird," and the taxidermist who stuffed it assured Mr. Bryant that the specimen had been killed in the vicinity of the city. (See *Forest and Stream*, vol. XXVI, p. 426.)

RUFIOUS HUMMING BIRD. *Selasphorus rufus* (GMEL.).

(Plate XL.)

Trochilus rufus GMEL., S. N. i, 1788, 497.—AUD., Orn. Biog. IV, 1838, 555.—NUTT., Man. 2d ed. I, 1840, 714.

Trochilus (Selasphorus) rufus SWAINS., F. B.-A. II, 1831, 324.

Selasphorus rufus AUD., Synop. 1839, 171; B. Am. IV, 1842, 200, pl. 254.—GOULD, Mon. Troch. pt. III, 1854, pl. 5 (part); vol. III, 1861, pl. 141 (part).—COOP., Orn. Cal. I, 1870, 355.—B. B. and R., Hist. N. Am. B. II, 1874, 459, pl. 47, fig. 4.

Selasphorus henshawi ELIOT, Bull. Nutt. Orn. Club, II, Oct. 1877, 97, 102; Class. and Synop. Troch. 1879, 111.

Nootka Sound Humming Bird.

Ruff-necked Humming Bird (LATHAM, AUDUBON).

Ruff-necked Honey-sucker (PENNANT).

Cinnamon, or Nootka Humming Bird (SWAINSON).

Rufous-backed Humming Bird.

Rufous Flame-bearer (GOULD).

Le Sélaspore sasin (MULSANT and VERREAUX).

Chupamirto pecho dorado (D'OCA).

RANGE.—Western North America, breeding from the higher mountains of southern California northward, near the coast, to Nootka Sound, Alaska; during migrations, east to Montana, Colorado, New Mexico, and western Texas; wintering on table-lands of Mexico.

SP. CHAR.—*Adult male* with the upper parts, except top of head and wing-coverts, deep cinnamon-rufous or brick-color, the back sometimes washed with green but never continuously of this color; top of head dull bronze or bronzy green; gorget intensely brilliant metallic scarlet, changing to golden in certain lights; chest white, the remaining under parts light cinnamon-rufous, paler along median line. Tail-feather next to middle pair with a notch near end of inner web, the outer web sinuated near tip; outer tail-feather more than 0.10 of an inch wide; length, about 3.25–3.70; wing, 1.50–1.60; tail, 1.30–1.35; exposed culmen, 0.60–0.65. *Adult female*, bronze-green above; all the tail-feathers, including middle pair, cinnamon-rufous basally, the three outer broadly tipped with white and crossed by a broad subterminal band of black; terminal or subterminal portion of fourth feather also black, the white tip, if present, very small; outer feather more than 0.10 of an inch wide; chin, throat, chest, and median portion of breast white, other lower parts pale cinnamon-rufous; throat usually spotted with metallic scarlet or golden red, often with a considerable patch of this color; length, about 3.50–3.90; wing, 1.75–1.80; tail, 1.12–1.30; exposed culmen, 0.65–0.72.

Adult male (No. 2896, Columbia River, Oregon, May, 1835; J. K. Townsend): Forehead and crown dull bronze, without greenish tinge; wing-coverts greenish bronze; remiges dusky, or dull brownish slate, very faintly glossed with purplish; rest of upper parts uniform deep cinnamon-rufous, without a trace of green; rectrices with a broad median streak of purplish dusky on the terminal portion (this streak about .45 of an inch long on middle feathers), but on two outer feathers this dusky color confined to outer webs. A small white spot immediately behind eye. Lores, suborbital region, and ear-coverts light cinnamon-rufous. Chin and entire throat, including the elongated postero-lateral feathers or "ruff," intensely brilliant metallic scarlet, more purplish, or ruby, red in some lights, golden red in others; chest white; rest of lower parts light cinnamon-rufous, deeper on sides and flanks; downy tufts between rump and flanks white, tinged with rufous. Bill and feet black. Length (skin), 3.40; wing, 1.50; tail, 1.20, lateral feathers, 0.30 shorter; exposed culmen, 0.62.



RUFIOUS HUMMING BIRD (*Selasphorus rufus*).

Male. (Cat. No. 91741, U. S. N. M. Baird, California. Collected by Charles H. Townsend.)

Female. (Cat. No. 94678, U. S. N. M. Santa Fé Mountains, New Mexico. Collected by H. W. Henshaw.)

Nest. (Cat. No. 3026, U. S. N. M. Port Townsend, Washington. Collected by J. G. Swan.)

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

Adult female (No. 1943, Columbia River, Oregon, May 29, 1835; J. K. Townsend): Above bronze-green, becoming dull grayish brown, very faintly glossed with bronze-green, on forehead and crown; upper tail coverts and feathers of the rump cinnamon rufous with green tips, the longer tail-coverts with the edges also rufous; middle tail-feathers with the basal half (concealed by the coverts) deep cinnamon-rufous, except along the median line, which is metallic green, like the terminal portion; three outer tail-feathers broadly tipped with white, this preceded by a broad space of purplish black, this by a smaller space of metallic green, the basal portion cinnamon-rufous, the outermost feather having a mere trace of the green, and on outer web only; fourth feather with the tip purplish black for about 0.22 of an inch, then green for about 0.10 of an inch (measured along shaft), the remaining portion cinnamon rufous. Lores, orbital region, and ear-coverts light cinnamon; a small white spot immediately behind eye. Chin and throat white, the latero-posterior portion of the latter spotted with greenish bronze, and the lower median portion covered by an irregular patch of metallic scarlet; chest white; sides and flanks light cinnamon-rufous, fading into white on median portion of breast and belly; under tail-coverts pale cinnamon-rufous with whitish tips. Bill and feet black. Length (an), 3.60; wing, 1.78; tail, 1.12, outer feathers 0.20 shorter; exposed culmen, 0.72.

Young male (No. 84129, Fort Whipple, Arizona, August 22, 1864; E. Coues): Similar to the adult female, but more golden green above, the top of the head nearly as bright as the back; middle tail-feathers chiefly rufous, but with larger dusky terminal space than in adult male; beneath as in adult female, but chin and throat conspicuously spotted, the spots small and brownish anteriorly, large and bronze-green posteriorly; center of throat showing several metallic golden red new feathers, of the adult plumage; outer primary broader.

Young female (No. 36912, Fort Whipple, Arizona, August 22, 1864; E. Coues): Similar to the young male, but green above much less golden, and with no rufous showing on rump, while that on upper tail-feathers is confined to the margins of the feathers; middle tail-feathers almost wholly green, only the lateral portions of the extreme base being pale brownish with a rusty tinge; outer primary broader and more curved.

Adult males vary in regard to the color of the back, which is usually (?) without a trace of metallic green, but often has more or less of this color, even the rump being sometimes mixed with green-tipped feathers. When the green is present, however, it is never continuous as in *S. alleni* nor nearly so extensive, while the peculiar form of the tail-feathers, so different from those of *S. alleni*, is just the same as in those examples which have the back and rump wholly rufous. In the color of the ruff or gorget there is very little variation, except that when the plumage becomes old the color becomes "tarnished" to a

more golden or brassy hue, particularly on the tips of the feathers, this condition characterizing all of the three Mexican (winter ?) specimens in the collection, besides several of those from the United States. The color of the top of the head varies from an almost coppery bronze to a decided green hue.

Adult females vary chiefly in respect to the throat, which may be entirely without any metallic feathers, but usually has a more or less extensive irregular patch of metallic golden red ; but there is also much variation in the extent and intensity of the light cinnamon-rufous of the sides and flanks.

Young males may be immediately distinguished from females by the much greater amount of rufous on the tail, the four middle feathers being chiefly of that color, though the terminal dusky spaces are much more extensive than in adult males, the white tips and subterminal black spaces of the other rectrices being essentially as in the females.

Although the mature plumage of the male usually first begins to make its appearance on the throat, there is a specimen in the National Museum collection (No. 79915, Marin County, California, April, 1880) which although having assumed entirely the adult plumage so far as other parts are concerned has only a single metallic feather on the throat.

Of all our western Humming Birds, the Rufous-backed has the widest distribution, its breeding range extending from the mountains of Arizona to latitude 61° on the coast of Alaska, and from the Pacific coast to New Mexico and Colorado. It must not be inferred from this general statement, however, that the species breeds everywhere within the wide extent of territory thus defined, for, on the contrary, certain conditions of climate and vegetation, dependent on altitude as well as latitude, are necessary for its existence. In Colorado, for example, it is said to breed only above an elevation of 6,500 feet, ranging thence up to 10,500 feet,* although in the Santa Catalina Mountains of southern Arizona, so much farther south, its breeding range is said to be between 4,000 and 6,000 feet elevation.†

In Ventura County, California, it is said to be the most abundant species of the family during summer;‡ but Mr. Belding says that in the Sierra Nevada it is a rare summer resident above 4,000 feet. It seems not to occur at all in Lower California, except possibly as a casual visitant or straggler, since Mr. Belding never met with it during his several explorations of that peninsula.

For original observations on the habits of the Rufous Humming Bird, we owe more to Mr. H. W. Henshaw than to any other writer. Mr. Henshaw found it "by far the most abundant of the family in New Mexico and Arizona, as shown in every locality visited by our party.

* Drew, Auk., III, 1885, p. 17.

† Scott, Auk, III, 1886, p. 431.

‡ Evermann, Auk., III, 1886, p. 180.

Quite numerous at Inscription Rock, but at Apache during the month of August they were seen literally by hundreds hovering over the beds of brightly-tinted flowers, which in the mountains especially grow in the greatest profusion on the borders of the mountain-streams. This bird seems to affect no particular locality, but is about equally abundant on the high mountains, in the open tracts of pine woods, in the valleys and deep cañons, or, in fact, wherever flowers are found. The males are very pugnacious, and wage unremitting warfare on all the other species, as well as among themselves. Even as late as August it was not uncommon to see these birds still in pairs, and established in certain areas, of which they appeared to consider themselves the sole possessors, allowing no intruders. They manifested an especial animosity against the Broad-tailed Hummer, and, on the appearance of one, would instantly dart forth with shrill, angry notes, and attack and drive away the intruder, while the female, sitting on some neighboring tree, would watch the oft-repeated contest with evident interest and solicitude. At Camp Grant, during the last days of September, they were still numerous, but after leaving this point I did not again see the species.”*

Mr. Henshaw found this species “quite common in summer throughout California,” and breeding “apparently as common in the valleys as in the mountains.” He also found it breeding near the headwaters of the Pecos River in New Mexico, and regarding their nesting there says:†

As to their nesting, it is a curious and almost unaccountable fact that notwithstanding their great numbers we found but a single nest, and this after it was deserted. Inquiry among the settlers showed that they had never chanced upon their nests, and I judge that the greater part nest, as I found to be the case in Arizona, in the upper limbs of the pines; occasionally they nest lower. The one I found was on a dead aspen, not more than 10 feet from the ground. At the time when they are building their nests may be readily found. One has only to follow the birds straight to their nesting-sites as they bear away material in the shape of conspicuous tufts of cottony down from the willows.

It seems as though *S. rufus* must breed rather less abundantly in this locality than *S. platycercus*; at all events, while the former was much less common at and for a considerable time after the date of our arrival, by August 1, when the males of *S. platycercus* had about disappeared, the males of the former species were more numerous than ever. This fact is attributed to a migration from somewhere further north, though this locality is, in truth, about the most northern limit of the species in the Rocky Mountains.

A single *S. rufus* was seen September 15. It was the last bird of the season.

ALLEN'S HUMMING BIRD. *Selasphorus alleni* HENSIL.

Selasphorus alleni HENSIL, Bull Natt. Orn. Club, II, July, 1877, 53.

Selasphorus rufus (part) GOULD, Mon. Troch., pt. III, 1854, pl. 5 (green-backed specimens); vol. III, 1861, pl. 141 (do.).—ELLIOT, Class. and Synop. Troch., 1879, 110 (excl. synonymy).

Green-backed Humming Bird (COUES).

* Rep. Orn. Spec. Wheeler's Exp., 1874, p. 131.

† The Auk, vol. III, 1886, pp. 77, 78.

RANGE.—Coast region of California and British Columbia; Arizona (Santa Catalina Mountains, rare).

SP. CHAR.—*Adult male* with top of head, hind neck, back, scapulars and wing-coverts metallic green; rump, upper tail-coverts, tail, lores, orbital region, ear-coverts, sides, and flanks cinnamon rufous; gorget intensely brilliant metallic scarlet (exactly as in *S. rufus*); chest white; tail-feathers next to middle pair tapering gradually, without notch or sinuation near tip, and outer tail-feathers much less than .10 of an inch wide; length about 3.25–3.40, wing 1.50–1.55, tail 1.05–1.15, exposed culmen 0.60–0.65.

Adult female metallic green above, with basal portion of tail-coverts and of all the tail-feathers cinnamon rufous; four middle tail-feathers blackish terminally, metallic green subterminally; three outer pairs chiefly blackish, with broad white terminal spots, the outermost with little if any rufous at base and not more than 0.10 of an inch wide; length about 3.30–3.40, wing 1.65–1.70, tail 1.00–1.15, exposed culmen 0.65–0.70.

Adult male (No. 84133, Nicasio, Marin County, California, March 17, 1877; C. A. Allen): Forehead, crown, hind neck, back, scapulars, and wing-coverts metallic green; lores, orbital region, ear-coverts, sides of neck, sides of the body, rump, upper tail-coverts, and tail, deep cinnamon-rufous, the feathers of the rump tipped with metallic green and the tail feathers marked at tips with a median broad streak of purplish dusky (about 0.40 long on middle feathers); remiges dusky brownish slate, faintly glossed with purplish. Gorget intensely brilliant metallic scarlet, varying to golden and ruby (exactly as in *S. rufus*); chest white; remaining lower parts cinnamon-rufous, paler along median line of breast and belly, deeper on sides; downy tufts between rump and flanks pure white. Length (skin), 3.40; wing, 1.50; tail, 1.15, the lateral feathers 0.30 shorter; exposed culmen 0.65.

Adult female (No. 84135, Nicasio, Marin County, California, March 17, 1877, C. A. Allen): Above metallic green, becoming much duller and more dusky on anterior part of head; feathers of rump and upper tail-coverts cinnamon-rufous basally, metallic green at tips; tail-feathers extensively cinnamon-rufous at base; two middle pairs black terminally and metallic green subterminally; three outer pairs with broad white tips, preceded by a much more extensive subterminal space of black, the second and third with a little metallic green between the black and the basal rufous, which is much duller than that on the middle feathers; remiges dusky, faintly glossed with purplish. A superciliary stripe of dull rusty buff, extending to above the eyes; lores darker; sides of chin, malar region, suborbital region, and ear-coverts pale dull buffy, fading into white on the throat and middle portion of the chin, the former spotted with metallic orange-red; chest and belly white; sides and flanks light cinnamon rufous, the under tail-coverts similar, but paler. Bill and feet black. Length (skin), 3.30; wing, 1.65; tail, 1.00, the outer feathers, 0.22 shorter; exposed culmen, 0.65.

The very close resemblance in coloration between this species and *S. rufus* is really remarkable, the only obvious differences in the male consisting in the green instead of rufous back and the smaller blackish terminal markings of the tail-feathers; but the different shape of the tail-feathers is so decided a character that even were the coloration absolutely identical in the two they could nevertheless be easily distinguished. The females are still more alike in color, the only difference that I am able to find, with only two females of *S. alleni* for comparison, consisting in the markings of the tail-feathers, the middle pair of which, in *S. alleni*, have much more rufous, while a considerable portion of their tips is black, this black being either more restricted or even wholly absent on the same feathers in *S. rufus*. The under tail-coverts are also deeper cinnamon-rufous; with a large series for comparison, however, these apparent differences may be found to disappear, so that it would be necessary to depend entirely upon the really very great difference in the width of the exterior rectrices in order to distinguish females of the two species.

Allen's Humming Bird so closely resembles the Rufous-backed in general appearance that unless specimens are actually obtained it is not easily identified; consequently its range is not well made out. That its range is far more restricted than that of the common species is, however, quite certain. It is essentially confined to the coast district of California, but reaches into British Columbia on the north. Only one specimen has been recorded from any locality outside of California to the southward, the one in question having been taken in the Santa Catalina Mountains, Arizona, at an altitude of 4,500 feet, July 23, 1884, by Mr. W. E. D. Scott.* According to Mr. Belding, it has not yet been found in central California; arrives at San Diego, from the southward, at about the same time as *S. rufus*; is quite a rare summer resident at Santa Cruz, and is not common in San Bernardino County. It appears to be more numerous in Nicasio County than elsewhere, and it was there that Mr. C. A. Allen, of Nicasio, obtained the fine series of specimens that enabled Mr. Henshaw to define the characters of the species. Mr. Henshaw was furnished by Mr. Allen with observations on its habits, which are well worth reproducing here.

Mr. Allen remarks incidentally in a letter that the green backs, as he calls individuals of *S. alleni*, are much the livelier and more active of the two, keeping constantly in the open and always perching on the most prominent dead twigs they can find. Their extreme shyness, as contrasted with the unsuspicious nature of the rufous-backs, is quite remarkable. They seem to possess a larger share than usual of the courage and pugnacity which is constantly displayed in birds of this family. Not only do they always come off the victors when chance encounters take place between them and the rufous-backs, but Mr. Allen has seen a pair attack and put to rout a Red-tailed Hawk; while, as he remarks,

* The Auk, vol. III, 1886, p. 431.

Sparrow Hawks have no chance at all with them. He has often seen the little fellows in hot chase after these latter birds, and their only care seemed to be to get out of the way as soon as possible of foes so determined.

The Rufous-backed Hummer, on the contrary, frequents the thickets and is always unsuspicious and easily approached. The different localities they affect may indicate a difference in the flowers from which they obtain their food.*

The nesting habits of Allen's Humming Bird are thus interestingly described by Mr. W. Otto Emerson, of Hayward's, California:†

I will here speak of Allen's Humming Bird (*Selasphorus allenii*), that commenced to build its nest on a running rose, under the porch roof, and within 8 feet of the floor, in front of our bedroom window, on May 27, 1885. She commenced the nest on the end of the stalk, by bringing a lot of willow cotton and webs. She would place herself on the spot chosen, then with her bill, running it here and there around the edge of the bottom, picking out a bit here and there, to place some other in its place, then working her wings in a fluttering manner to shape the nest around her body. On May 31 she laid her first egg, although the nest was not all done yet. She laid some time before 10 o'clock, as I kept watch of her, and she had been sitting all day on account of the high winds blowing the running rose stalks. By sitting close she kept the egg from rolling out. Once or twice she left the nest to get a bit of web or cotton to put around the nest. On June 1 she did not lay an egg, as the wind was blowing hard all day. So she had to keep on her nest to save her egg. The nest swung like "the cradle in the tree top" of nursery rhyme fame. The nest looked about half-done, a great deal of cotton from the willows and the stamens of the Australian blue-gum tree flowers. June 3 one of the eggs got shaken out of the nest and got broken on the floor. Still she sat. On June 4 the wind was very violent and switched out the other egg. The bird would come to the nest, look in, and then dart away, hovering in the air, give two or three sharp rasping notes, and then fly off to hunt her mate to tell him of their fate. The nest still hangs there to the winter winds.

For an entertaining account of the habits of Allen's Humming Bird in captivity, the reader is referred to an article by Mrs. C. M. Crowell, in the Ornithologist and Oölogist, vol. VII, 1882, pp. 126-128.

BROAD-TAILED HUMMING BIRD. *Selasphorus platycercus* (SWAINS.).

Trochilus platycercus SWAINS., Philos. Mag., I, 1827, 441.

Selasphorus platycercus BONAP., Rev. et Mag. Zool., 1854, 257.—GOULD, Mon.

Troch. pt. III, 1852, pl. 7; vol. III, 1861, pl. 140.—COOP., Orn. Cal. I, 1870, 357.—B. B. and R., Hist. N. Am. B., II, 1874, 462, pl. 47, fig. 5.

Broad-tailed Flame-bearer (GOULD).

LeSélasphore à large queue (MULSANT and VERREAUX).

Chupamirto de pecho color de carmin (D'OCA).

RANGE.—Rocky Mountain district of United States, north to Wyoming and Utah, west to East Humboldt Mountains, Nevada (to eastern slope of Sierra Nevada?); breeding as far south as mountains of Arizona and New Mexico; in winter south over table-land of Mexico to highlands of Guatemala.

* Bulletin of the Nuttall Ornithological Club, vol. II, 1877, pp. 55, 56.

† Ornithologist and Oölogist, vol. XI, No. 3, p. 37.

SP. CHAR.—*Adult male*: Above, metallic bronze-green; tail, except middle feathers, purplish black; the fourth (sometimes third also) edged with rufous—rarely some of the tail-feathers with small whitish terminal spots; gorget, metallic wine-purple or solferino; length (before skinning) about 4.00–4.70; wing, 1.85–2.05; tail, 1.35–1.60; exposed culmen, 0.60–0.70. *Adult female* similar above to the male, but three or four outer tail-feathers extensively rufous at base, the three outer ones with broad white tips; chin and throat white, more or less streaked or dotted with brownish; sides and flanks pale rufous or cinnamon-buff; length, about 3.60–4.70; wing, 2.00–2.10; tail, 1.35–1.50; exposed culmen 0.70–0.72.

Adult male (No. 10847, Ft. Bridger, Wyoming, May 30, 1858; C. Drexler): Above, metallic bronze-green, including whole top of head and middle pair of tail-feathers; remiges dull brownish slate or dusky, very faintly glossed with purplish; tail-feather next to middle pair dark metallic green on inner web, the outer web purplish black, glossed with green toward end, and broadly edged with rufous; next wholly purplish black, except a very narrow rufous edging to both webs; next similar, but with rufous edging to outer web confined to basal portion; outer feather with no rufous edging to either web; a minute white spot immediately behind eye; gorget, metallic rose-purple; chest, median line of breast and belly, anal region and under tail-coverts white, the the longer feathers of the latter with a central mark of dusky; sides and flanks metallic bronze-green, the latter tinged with rusty. Bill and feet black. Length (skin), 3.60; wing, 2.00; tail, 1.35; exposed culmen, 0.68.

Adult female (No. 94680, Santa Fé, Mountains, New Mexico, August 1; H. W. Henshaw): Above, bronze-green, becoming dull, dusky, grayish brown on forehead and crown; remiges dull brownish slate, very faintly glossed with purplish; tail-feathers next to middle pair with about the basal half rufous, then a triangular patch of metallic green, this succeeded by a patch of purplish black (its transverse anterior outline .35 from the tip), the apex of the feather formed by a small roundish spot of dull buff; next feather tipped with a large oval spot of white, and the green between the subterminal black and basal rufous much reduced (only about 0.10 of an inch wide); next similar, but with the green still more reduced and the white terminal spot correspondingly larger; outer feather with the white tip 0.35 long, and a mere trace of green between the black and the rufous. Chin and throat white, each feather with a small central spot of dull bronze; chest, white; median line of breast and belly and under tail-coverts white, tinged with pale rufous or ochraceous-buff; sides and flanks deep ochraceous buff or cinnamon-buff; bill and feet black. Length (skin), 3.60; wing, 2.10; tail, 1.35 (outer feathers, 0.15 shorter); exposed culmen, 0.72.

The principal variation in adult males consists in the coloration of the exterior tail-feathers, one or more of which frequently show more

or less distinct whitish spots at the tips. In fact, of the ten specimens at this moment under examination, as many as six possess this character, more or less pronounced, thus showing that it is by no means exceptional. In three of these it is confined to an indistinct edging to the terminal portion of the inner web of the lateral feather, the second having merely a trace of this whitish edging. In the others, however, the white amounts to a considerable spot at the tip of both webs, and is present on the third as well as the first and second, though much reduced in extent. The color of the gorget varies but little, except in a specimen from Mexico (No. 60073, A. Boucard), in which it is more of a geranium red, caused by the tips of the feathers being "tarnished" to a more golden hue.

An adult male from Guatemala (No. 33647, O. Salvin) differs from more northern specimens only in smaller size, its measurement being as follows: Length (skin), 3.45; wing, 1.85; tail, 1.40; exposed culmen, 0.60.

Adult females, as in *Trochilus alexandri* and other species, vary chiefly in the markings of the chin and throat, some having the central guttate spots to the feathers pale grayish brown or olive and very small, while others have these markings much darker in color as well as larger. In none of the specimens examined, however, are there any metallic feathers on the throat, such as are frequently seen in females of *S. rufus* and *S. alleni*. An example from Mexico (No. 13636, J. Gould) differs from United States examples in having the basal portion of the rectrices much duller rufous, this color also much more restricted. The specimen may, however, possibly be a young male.

The Broad tailed Humming Bird is the most common, or at least most conspicuous, species of the family in the Rocky Mountain district, although it seems to be more particularly characteristic of the eastern portions, gradually diminishing in numbers, or at least in the continuity of the areas which it inhabits, to the westward. I am unable to find any authentic record of its occurrence west of the one hundred and sixty-first meridian, where in the East Humboldt Mountains, Nevada, I found it fairly common in August, 1868.

In the Rocky Mountain district proper, as in Colorado, for example, it breeds at an elevation of from 4,000 to 11,000 feet,* and I found it having about the same vertical range in the East Humboldt Mountains. In the San Francisco Mountains, Arizona, according to Dr. Mearns,† it is an abundant summer resident of the spruce belt. At Fort Garland, Colorado, Mr. Henshaw found it most numerous along the mountain streams, at an altitude of about 7,000 feet. It breeds abundantly in the mountains of northern New Mexico, but in those of southern Arizona it is said to be comparatively rare during the breeding season. On the Upper Pecos River, New Mexico, Mr. Henshaw found the Broad-

* Drew, *The Auk*, vol. III, p. 17.

† *The Auk*, vol. VII, p. 255.

tailed Humming Birds "extra" were very numerous; young birds were noticed August 1, and by the 10th they became common. By August 1, the males of this species began to get less numerous, and by the 10th there were none; in fact, I saw very few after that date. This is an extremely interesting fact. Wherever I have been in the West, and for that matter in the East also, I have always been led to wonder at the apparent absence of males early in fall in localities where the females and young were very numerous. The observations I was able to make here solved the problem to my satisfaction. The truth appears to be that *immediately* upon the young leaving the nest the males abandon their summer limits and at once set out for their winter quarters, leaving the females and young to follow at their convenience.

In this locality at least there is an evident reason for this. Just about this date the *Scrophularia*, which is the favorite food plant of the Hummers, begins to lose its blossoms, and in a comparatively short time the flowers give place to the seed pods. Though there are other flowers which are resorted to by the Hummers, particularly several species of *Pentstemon*, they by no means afford the luxurious living the former plant does. It seems evident, therefore, that the moment its progeny is on the wing, and its home ties severed, warned of the approach of fall alike by the frosty nights and the decreasing supply of food, off go the males to their inviting winter haunts, to be followed not long after by the females and young. The latter—probably because they have less strength—linger last, and may be seen even after every adult bird has departed.”*

In the San Francisco Mountains, Arizona, Dr. Merriam found them "very abundant in the balsam belt and the upper part of the pine belt. A nest containing two nearly fledged young was found on the limb of a Douglas fir, about 4 feet from the ground, July 31. The principal food plant of this Humming Bird is the beautiful scarlet trumpet flower of *Pentstemon barbatus torreyi*. During the latter part of August and early September, after it had ceased flowering, these birds were most often seen in the beds of the large blue larkspur (*Delphinium scopulorum*); They wake up very early in the morning and go to water at daylight no matter how cold the weather is. During the month of August, and particularly the first half of the month, when the mornings were often frosty, hundreds of them came to the spring to drink and bathe at break of day. They were like a swarm of bees, buzzing about one's head and darting to and fro in every direction. The air was full of them. They would drop down to the water, dip their feet and bellies, and rise and shoot away as if propelled by an unseen power. They would often dart at the face of an intruder as if bent on piercing the eye with their needle-like bill, and then poise for a moment almost within reach before turning, when they were again lost in the busy throng. Whether this act was prompted by curiosity or resentment I

* The Auk, vol. III, 1886, p. 75.

was not able to ascertain. Several were seen at the summit of the mountain during the latter part of August. They were found also at the Grand Cañon of the Colorado, September 12 to 15. They began to leave the mountain during the first week in September, and none were seen after the middle of the month.*

Mr Henshaw mentions the marked hostility existing between this Humming Bird and the Rufous-backed species, but adds that, "in the fall, when migrating, they are brought by the similarity of tastes and habits into the same localities, and their combined numbers are in some favored spots in Arizona simply surprising. The beds of bright flowers about Willow Spring, in the White Mountains, Arizona, were alive with them in August, and as they moved swiftly to and fro, now surfeiting themselves on the sweets they here found so abundant, now fighting with each other for possession of some such tempting prize as a cluster of flowers, their rapid motions, and the beauty of their colors, intensified by the bright sunlight—the gorgets of gold and purple contrasting against their emerald and bright-red bodies—conspired to an effect not soon to be forgotten."†

Genus **STELLULA** GOULD.

Stellula GOULD, Introd. Troch. 1861, 90. Type, *Trochilus calliope* GOULD.

Stellura MULS. and VERR., Class. Troch. 1865, 88. Same type.

GENERIC CHARACTERS.—Six middle tail-feathers contracted in the middle and widened for the terminal portion, being thus of somewhat spatulate or pandurate form; *adult male* with feathers of chin and throat narrow, those of the latero-posterior portion of the latter elongated so as to form a conspicuous ruff, only their terminal half metallic, the basal portion being pure white; middle tail feathers without any green.

This genus appears to be most nearly related to *Atthis*, but is quite distinct in the peculiar form and coloration of the feathers of the gorget, as well as of the rectrices. But one species is known, this being easily distinguished, in all stages of either sex, by the peculiar form of the tail feathers, as noted above.

CALLIOPE HUMMING BIRD. *Stellula calliope* GOULD.

(PLATE XLI.)

Trochilus (Calothorax) calliope GOULD, P. Z. S. 1847, 11.

Stellula calliope GOULD, Introd. Troch. Oct. ed. 1861, 90.—COOP., Orn. Cal. I, 1870, 363.—B. B. and R., Hist., N. Am. B. II, 1874, 445, pl. 47, fig. 9.

Calothorax calliope GOULD, Mon. Troch. pt. XV, 1857, pl. 2; vol. III, 1861, pl. 142.

Mexican Satellite (GOULD).

Star-throated Humming Bird.

Satellite Humming Bird.

La Stellure calliope (MULSANT and VERREAUX).

Chupamirto de rafaguita (D'OCA).

* North American Fauna, No. 3, p. 93.

† Zoölogy of Wheeler's Expedition, p. 378.



CALLIOPE HUMMING BIRD (*Stellula calliope*).

Male. (Cat. No. 67201, U. S. N. M. El Moro, New Mexico. Collected by H. W. Henshaw.)

Female. (Cat. No. 77447, U. S. N. M. Honey Lake, California. Collected by H. W. Henshaw.)

Nest. (Cat. No. 18914, U. S. N. M. Baird, California. Collected by Charles H. Townsend.)

RANGE.—Mountain districts of western United States, north to British Columbia, east to Montana, Utah, New Mexico, etc., and south over table-lands of Mexico; breeding south as far as San Bernardino Mountains, in California, and mountains of northern New Mexico.

SP. CHAR.—*Adult male* with the narrow and very distinctly outlined feathers of the gorget pure white basally, metallic reddish purple terminally; middle tail feathers somewhat spatulate, purplish black, edged with rufous toward base and broadly tipped with dull brownish gray; remaining rectrices similar but without distinct grayish tips and rufous basal edgings less distinct or even obsolete; under parts white, the sides and flanks metallic green mixed or washed with pale rusty; length (before skinning) about 3.10–3.30, wing 1.50–1.60, tail 0.80–1.10, exposed culmen 0.55–0.58. *Adult female* metallic bronze-green above, including the slightly spatulate middle tail-feathers; three outer tail-feathers broadly tipped with white, extensively black subterminally, the basal portion dull greenish, becoming buffy or pale rusty at extreme base; under parts white, the sides, flanks and under tail-coverts pale rusty or cinnamon-buff, the throat more or less spotted with brownish; length about 3.35–3.50, wing 1.75–1.80, tail 0.85–1.15, exposed culmen 0.58–0.60.

Adult male (No. 67201, El Moro, New Mexico, July 29, 1873; H. W. Henshaw): Above metallic bronze-green, becoming duller on forehead; remiges dull brownish slate, very faintly glossed with purplish; middle pair of tail-feathers dull black, broadly edged with rusty basally, and broadly tipped with dusky brownish gray (as if faded); rest of rectrices similar but fading gradually at tips into dusky brownish gray, and rusty basal edgings less distinct—quite obsolete on outer feather. Gorget with the feathers pure white for basal half or more, the terminal portion metallic solferino-purple; chest, sides of neck, and under tail-coverts pure white; median line of breast and belly dull white; sides and flanks bronze-green. Bill and feet brownish black.* Length (skin), 2.75†; wing, 1.50; tail, 0.80; exposed culmen, 0.58.

Adult female (No. 91748, Baird, California, May 29, 1883; Chas. H. Townsend): Above, metallic bronze-green, including middle pair of tail-feathers, which are entirely without rufous, even at extreme base; tail-feather next to middle pair dark metallic green, both webs edged with rusty toward base, the terminal portion of outer web black (for about 0.25 of an inch), the corresponding portion of inner web inclining to the same; next feather with a considerable terminal spot of white, this preceded by a black band more than 0.25 of an inch wide, the remaining portion metallic green, broadly edged toward base with rusty; next

* According to Dr. J. C. Merrill (The Auk, July, 1888, p. 257), the fresh colors are as follows: "Upper mandible dead black, the lower light flesh color darkening towards the tip, which was black; the feet dark flesh-color, the irides brown."

†Specimens in the flesh, according to Dr. Merrill, measure in length from 3.10 to 3.30; a young male shot by me measured $2\frac{1}{2}$ in length.

feather similar, but white spot larger and rusty edgings less distinct; outer feather with the white about equal to the black in extent, the basal portion dull brownish gray, faintly tinged with green next to the black, the shaft being very pale brown or buffy. Chin and throat white, faintly flecked with brown, with larger and much more distinct spots of bronzy green on the latero-posterior portion; rest of under parts pale cinnamon-buff, the belly nearly white. Bill and feet blackish. Length (skin), 3.10;* wing, 1.68; tail, 0.85, the lateral feathers about 0.10 shorter; exposed culmen, 0.60.

Young male (No. 69135, Mt. Graham, Arizona, September 20, 1874; H. W. Henshaw): Not essentially different from some adult females. Middle of throat showing several metallic reddish purple (new) feathers.

Adult males vary slightly in the color of the metallic portion of the throat-feathers, which in some are a little less reddish purple than in the example described. Some specimens show a decided pale cinnamon or cinnamon-buff wash on sides and flanks, others having scarcely a trace of it. There is the usual range of variation in the color of the upper parts, which may be nearly pure green or with a decided bronzy hue, the latter, however, exceptional in the considerable series examined.

Adult females vary chiefly in the distinctness of the small dusky markings on the throat, which are sometimes quite obsolete except laterally and posteriorly, and the middle pair of tail-feathers sometimes show a slight rusty edging near the base and a black terminal space.

This is the smallest of our North American Humming Birds, but, notwithstanding its diminutive size, has a very extensive distribution, ranging farther north than any other of the western species except *Selasphorus rufus*, and extending from the Pacific Coast nearly, if not quite, to the main chain of the Rocky Mountains. Like the Rufous Humming Bird, however, it does not inhabit every portion of the extensive region indicated, but only such parts as are suited to it by topographical or climatic conditions. In California, according to Mr. Stephens,† it breeds as far south as the San Bernardino Mountains, where it inhabits the pine region, but in most parts of that State it is, according to Mr. Belding, rare and chiefly a migrant, though breeding in the Sierra Nevada above 4,000 feet. Mr. Townsend‡ found it breeding abundantly on the McCloud River, in the northern part of the State, as did Dr. Merrill§ at Fort Klamath, Oregon. Dr. Merriam|| obtained a female on the 3d of July at Fort Ellis, Montana, where the species was doubtless breeding, and Mr. John Fannin records it as a

* Before skinning, this specimen measured $3\frac{1}{8}$ or about 3.33 inches in length; a female measured by Dr. Merrill was 3.35 long, while two measured in the flesh by myself were respectively $3\frac{9}{16}$ and 3.50 long.

† Land Birds of the Pacific District, by Lyman Belding, 1890, p. 89.

‡ Pr. U. S. Nat. Mus., vol. x, p. 209.

§ The Auk, vol. v, 257.

|| Sixth An. Rep. Geol. Surv. Terr., 1873, p. 693.

common summer resident at Buzzard Inlet, British Columbia. It has not yet been taken in Colorado; but it may be expected to occur in the western portion of that State, since the present writer found it to be not uncommon in the Wasatch Mountains of Utah, where in fact it was almost as numerous as was *Selasphorus platycercus*. Mr. Henshaw found it rather numerous in summer along the Upper Pecos River, in New Mexico. In the Santa Catalina Mountains of southern Arizona it appears to be merely a transient, Mr. Scott* having met with it only during April and August, only a single example having been seen by him on each occasion, and he observes that Mr. Herbert Brown has not found it about Tucson, nor indeed at other points in Arizona visited by him. Hence we may infer that it is, like the Rufous Humming Bird, essentially a northern or alpine species, so far as its breeding range is concerned.

Regarding its probable breeding in northern New Mexico, Mr. Henshaw writes as follows:†

This, the most diminutive of our Hummers, is rather numerous in summer in the locality in question, much further north than which it does not go.‡ The species has not yet been detected in Colorado, though I doubt not but that the higher mountains of the southern portion of that State afford a summer home for some of them. It is a curious fact in connection with the history of this species, as well as that of the *S. rufus*, that while both of them range far to the northward in the Sierra Nevada, reaching Washington Territory, and even going beyond into Alaska, they yet decline to visit even the middle portion of the Rocky Mountains, but confine their range to their southern parts. The Calliope Hummer is, as compared with the other species mentioned, a rare bird. It is also much less obtrusive, and in the contests of its larger neighbors it takes no part. When assailed, as it promptly is by the other kinds, it at once darts away to another spot where it can feed without molestation. It appears to be timid in every way, so much so that it is not an easy bird to collect. An utterly unaccountable fact noticed in connection with this species was the apparent rarity of females. Up to August 10 I had seen perhaps half a dozen, though constantly on the watch for them, while I had certainly seen not less than ten times that number of males. Subsequent to that date I saw a few more, but nothing like the number of males.

By September the young were numerous in certain localities, notably in a large sunflower patch.

Some points in the breeding habits of the Calliope Humming Bird are thus described by Dr. Merrill, in the Auk for July, 1888, p. 257, the locality being Fort Klamath, Oregon:

First taken May 17. A few Hummers, apparently of this species, had been seen for 10 days before this date, but they were not abundant until the 16th, after which the males were common about the blossoms of wild currant and gooseberry bushes. During the breeding season they are generally distributed, and are to be found in deep pine woods as well as in more open places, the constant sharp, shrill notes of the males indicating their presence and abundance. When pairing soon after their arrival, and with less frequency during the period of incubation, the males have a habit of poisoning themselves for some seconds at a height of 30 or 40 feet above the ground, and then dashing down nearly to the earth, rising as quickly to poise again, and repeating

* See The Auk, vol. III, 1886, pp. 431, 432.

† The Auk, vol. III, p. 78.

‡ It has, however, subsequently been recorded from localities very much farther north.—R. R.

the maneuver often; at such times their notes are particularly loud and attract attention from a considerable distance.

A nest brought to me about the middle of July, and which the young had just left, was placed upon a dead flattened cone of *Pinus contorta*. It was composed of thin strips of a gray bark, with a few spiders' webs on the outside; the lining was similar, but with a few small tufts of a cottony blossom from some tree; the nest was just the color of the cone and was admirably adapted to escape notice. Another nest containing two nearly fledged young was found at about the same time, but was quite unlike the one just described in construction and situation, being of the common Humming Bird type and saddled upon a dead willow twig. One of the young birds lived for about a week, becoming very tame and feeding greedily upon sirup.

Genus **CALOTHORAX** GRAY.

Calotherax GRAY, Gen. B., 1840, 13. Type, *Cynanthus lucifer* SWAINS.

Lucifer REICH., Synop. Av. Nat., 1849, pl. 39; Aufz. Colib., 1854, 13; Troch. Enum. 1855, 10. Same type.

Cyanopogon "REICH." BONAP., Ann. Soc. Nat., 1854, 138. Same type.

Manilia MULS. and VERR., Classif. Troch., 1865, 86. Type, *Calotherax pulchra* GOULD.

GENERIC CHARACTERS.—Bill much longer than the head, distinctly curved (except in *C. pulchra*); tail forked, the three outer feathers narrow, and plain purplish black, in adult males; gorget of adult males rich metallic amethyst, or magenta, purple with violet and blue reflections; females with tail double-rounded and deeply emarginate, the three outer feathers rufous at base, then black, tipped with white; under parts light ochraceous.

This genus is most nearly related to both *Doricha*, REICH.,* and *Acestrura*, GOULD,† between which it is nearly intermediate. In fact the three should probably be merged into one genus, *Calotherax*, with *Doricha* and *Acestrura* (including perhaps one or more subdivisions of the former) as subgenera.

The two known species of *Calotherax* are very much alike in coloration, but differ so decidedly in structural characters that little difficulty need be experienced in identifying them. Their differential characters are as follows :

*a*¹. Bill with exposed culmen about one and a half times as long as the head, distinctly curved; *adult male* with outer primary broader, and outer pair of tail-feathers very narrow, as well as pointed; *adult female* with belly white, and lateral pair of tail-feathers shorter than middle pair. HAB.: Table-lands of Mexico, north to southern Arizona.

C. lucifer (SWAINS.). *Lucifer Humming Bird*. (Page 359.)

*a*². Bill with exposed culmen only a little longer than the head, much more slender, and not decidedly curved; *adult male* with outer primary narrower, and outer pair of tail feathers much broader, and not pointed at ends; *adult female* with belly buffy, only a little paler than breast, &c., and outer pair of tail-feathers longer than middle pair. HAB.: Southwestern Mexico (Oaxaca, &c.).

C. pulchra GOULD. *Beautiful Humming Bird*.†

* *Doricha* REICH., Aufz. der Colib. 1853, 12. Type, *Trochilus enicurus* VIEILL.

† *Acestrura* GOULD, Introd. Troch., Oct. ed. 1861, 91. Type, *Ornismya mulsanti* BOURC.

‡ *Calotherax pulchra* GOULD, Ann. Mag. N. H., 3d ser., IV, 1859, 97; Mon. Troch., III, pl. 144.—*Manilia pulchra* MULSANT and VERREAUX, Hist. Nat. Ois.-Mouch., IV, 1877, 30, pl. 36.

LUCIFER HUMMING BIRD. *Calothorax lucifer* (SWAINS.).

(Plate XLII.)

Cynanthus lucifer SWAINS., Philos. Mag., I, 1827, 442.*Calothorax lucifer* GRAY, Gen. B., I, 1848, 110.—LAWR., Bull. Nutt. Orn. Club, II, 1877, 108 (Camp Bowie, Ariz.).*Ornismya cyanopogon* LESS., Ois.-Mouch., 1829, 50, pl. 5.*Calothorax cyanopogon* GRAY, Gen. B., I, 13.—GOULD, Mon. Troch., pt. XIV, 1857, pl. 1; vol. III, 1861, pl. 143.*Doricha enicura* (error) HENSII., Am. Sportsm., v, Feb. 20, 1875, 328 (Camp Bowie, Ariz.); Zool. Wheeler's Exp. 1875, 381.

Mexican Star (GOULD).

Le Calothorax Barbe-Bleue (MULSANT and VERREAUX).

Chupamirto morado grande (D'OCA).

Oiseau-Mouche Barbe-Bleue (PRÉVOST).

RANGE.—Table-lands of Mexico, north to southern Arizona.

SP. CHAR.—*Adult male* with the gorget rich metallic violet, varying to purplish blue; upper parts metallic bronze-green, the three outer tail-feathers purplish black, the outermost one excessively narrow; chest buffy white, belly and under tail-coverts purer white; sides and flanks dull greenish bronze, tinged with rusty; length, about 3.40-3.80; wing, 1.40-1.60; tail, 1.20-1.35 (forked for nearly half its length); exposed culmen, 0.75-0.90; the bill strongly curved. *Adult female* bronze-green above, including middle pair of tail-feathers; three outer tail-feathers light cinnamon-rufous for about the basal half, then black, the tips broadly white; post-ocular stripe, sides of neck, chin, throat, malar region, sides, and flanks pale cinnamon-buff; belly white; length (skin), about 3.30; wing, 1.65-1.80; tail, 1.20-1.25; exposed culmen, 0.75-0.90.

Adult male (No. 97727, Tupátaro, Mexico; Prof. A. Dugès): Above, metallic bronze-green, duller on top of head, more decidedly bronzy on rump and upper tail-coverts; remiges dull dusky slate, faintly glossed with purplish; four middle tail-feathers metallic green (scarcely bronzy), the other tail-feathers purplish dusky, some of them tinged at tips with metallic green, others minutely tipped with white. Gorget rich metallic magenta-purple, changing to violet in certain lights; chest dull white, tinged laterally and posteriorly with pale rusty; middle line of belly whitish, sides and flanks metallic bronze-green, tinged with rusty; under tail-coverts white, some of the feathers faintly bronzy-grayish at base; bill and feet black. Length (skin), 3.80; wing, 1.50; tail, 1.20, the middle feathers 0.50 shorter; exposed culmen, 0.85.

Adult female (No. 35170, Mirador, Mexico; Dr. C. Sartorius): Above, metallic golden green, much duller on top of head, the middle tail-feathers nearly pure green; remiges dull brownish slate or dusky, very faintly glossed with purplish; tail-feathers next to middle pair chiefly metallic green, the terminal portion black, shaft of the green portion pale rufous, and outer web broadly edged toward base with cinnamon-rufous; next feather with more than the basal half of both webs, includ-

ing shaft, cinnamon-rufous, the subterminal portion (for about 0.30 of an inch) black,* the tip (for about 0.15 of an inch) white; next feather similar, but with white tip more extensive; outer feather similar, but white tip still more extensive (about 0.22 long), the black correspondingly reduced, and no green between the black and the rufous. Broad post-ocular stripe (commencing above the eye), sides of neck, chin, throat, malar region, sides, and flanks uniform light cinnamon-buff, deepest on flanks; chest mixed white and cinnamon-buff; belly white; under tail-coverts pale creamy buff; bill and feet black. Length (skin), 3.30; wing, 1.65; tail, 1.10 (middle feathers 0.10 shorter and outer pair 0.20 shorter); exposed culmen, 0.80.

A female (perhaps not adult) from Arizona (No. 72535, near Camp Bowie, August 7, 1874, H. W. Henshaw) is quite similar in coloration to that described above, except that the entire chin and sides of the throat are dull grayish white, only the median portion of the throat (to within about 0.30 of an inch of the chin angle) being cinnamon-buff. Measurements are as follows: Length (skin), 3.35; wing, 1.70; tail, 1.00; exposed culmen, 0.85.

The claim of this beautiful species [says Mr. Henshaw*] to a place in our fauna rests upon the capture of a single female near Camp Bowie, Arizona. * ? * I regret that I am unable to give any information respecting either its habits or its relative abundance in Arizona. Probably it is rare, for here, as in certain other points in southern Arizona, the attention of the party was especially directed to the humming birds, the occurrence of novelties being rendered more probable by the abundance of certain other species, and at Camp Bowie notably by the great number of *Trochilus alexandri*. The well-known agave plants of this region were here very abundant, and their tall upright stems, surmounted by the short lateral stems, with their spreading bunches of blossoms, dotted the rocky hillsides in every direction and gave a strange, weird aspect to the landscape. Around these humming birds congregated, showing an especial liking for the nectar of the flowers, or possibly finding in them rich storehouses of the minute forms of insect life, which is the chief part of their diet. By taking a station near one of these, one could easily watch the motions of these little feathered gems as they darted to and fro, and, had any other species been even tolerably numerous, it could scarcely have eluded our attention.

Fortunately Mr. Gould has been able to give us, in his beautiful *Monograph of the Trochilidae* (vol. III, p. 143), a rather full life-history of the Lucifer Humming Bird, which is herewith transcribed:

This beautiful species, so well known by its trivial name of "Mexican Star," is a denizen of the table-lands of that rich country, Xalapa, the land of perpetual spring and of unsurpassed climate. It was in this fine region that the bird came under the observation of the late Mr. Bullock, to whom we are indebted for all that is known respecting it, and which is comprised in the following extracts from his *Six Months in Mexico*:

"The house I resided in at Xalapa for several weeks was only one story high, inclosing, like most of the Spanish houses, a small garden in the center, the roof projecting 6 or 7 feet from the walls, covering a walk all around and leaving a small space only between the tiles and the trees which grew in the center. From the

* There is a small space of metallic green separating the rufous from the black.

† *Zoölogy of Wheeler's Survey*, 1875, p. 382.



LUCIFER HUMMING BIRD (*Calothorax lucifer*).

Male. (Cat. No. 85862, U. S. N. M. Valley of Mexico. Collected by A. W. Butler.)

Female. (Cat. No. 115294, U. S. N. M. Arizona. Collected by O. T. Baron.)

edges of these tiles to the branches of the trees in the garden the spiders had spread their innumerable webs so closely and compactly that they resembled a net. I have frequently watched, with much amusement, the cautious peregrination of the Humming Bird, who, advancing beneath the web, entered the various labyrinths and cells in search of entangled flies, but, as the larger spiders did not tamely surrender their booty, the invader was often compelled to retreat; being within a few feet, I could observe all their evolutions with great precision. The active little bird generally passed once or twice around the court, as if to reconnoiter his ground, and commenced his attack by going carefully under the nets of the wily insect and seizing by surprise the smallest entangled flies, or those that were most feeble. In ascending the angular traps of the spider, great care and skill were required; sometimes he had scarcely room for his little wings to perform their office, and the least deviation would have entangled him in the complex machinery of the web and involved him in ruin. It was only the works of the smaller spider that he durst attack, as the larger sort rose to the defense of their citadels, when the besieger would shoot off like a sunbeam and could only be traced by the luminous glow of his refulgent colors. The bird generally spent about 10 minutes in this predatory excursion and then alighted on a branch of the *Avocata* to rest and refresh himself, placing his crimson star-like breast to the sun, which then presented all the glowing fire of the ruby and surpassed in luster the diadem of monarchs. Europeans who have seen only the stuffed remains of these little feathered gems in museums have been charmed with their beautiful appearance, but those who have examined them whilst living, displaying their moving crests, throats, and tails, like the Peacock, in the sun, can never look with pleasure on their mutilated forms. I have carefully preserved about two hundred specimens in the best possible manner, yet they are still but the shadow of what they were in real life. The reason is obvious, for the sides of the laminae or fibers of each feather, being of a different color from the surface, will change when seen in a front or oblique direction, and, as each lamina or fiber turns upon the axis of the quill, the least motion, when living, causes the feathers to change suddenly to the most opposite hues. Thus the one from Nootka Sound changes its expanded throat from the most vivid fire color to light green; the Topaz-throated does the same, and the Mexican Star changes from bright crimson to blue.

"The sexes vary greatly in their plumage, so much so that the male and female could not have been known had they not been seen constantly together and proved to be so by dissection. They breed in Mexico in June and July; and the nest is a beautiful specimen of the architectural talent of these birds; it is neatly constructed with cotton or the down of the thistle, to which is fastened on the outside, by some glutinous substance, a white, flat lichen resembling ours.

"The female lays two eggs, perfectly white and large for the size of the bird; and the Indians informed me they were hatched in 3 weeks by the male and female sitting alternately. When attending their young they attack any bird indiscriminately that approaches the nest. Their motions when under the influence of anger or fear are very violent, and their flight rapid as an arrow; the eye can not follow them; but the shrill, piercing shriek which they utter on the wing may be heard when the bird is invisible. They attack the eyes of the larger birds, and their sharp, needlelike bill is a truly formidable weapon in this kind of warfare. Nothing can exceed their fierceness when one of their own species invades their territory during the breeding season. Under the influence of jealousy they become perfect furies; their throats swell, their crests, tails, and wings expand; they fight in the air (uttering a shrill noise) till one falls exhausted to the ground. I witnessed a combat of this kind near Otumba during a heavy fall of rain, every separate drop of which I supposed sufficient to have beaten the puny warriors to the earth.

"In sleeping they frequently suspend themselves by the feet, with their heads downwards, in the manner of some parrots.

"These birds were great favorites of the ancient Mexicans. They used the feath-

ers as ornaments for their superb mantles in the time of Montezuma, and in embroidering the pictures so much extolled by Cortez. Their name signifies in the Indian language 'beams or locks of the sun,' and their feathers are still worn by the Indian ladies as ornaments for the ears."

I have numerous specimens of this bird in my collection, and observe that those procured in one locality differ somewhat from those obtained in another; for instance, the examples collected by my friend Floresi in the neighborhood of the Real del Monte mines are larger and altogether more powerful birds than those brought to this country by M. Sallé and other collectors from Cordova. Bullock speaks with great truth when he states that the sexes differ considerably, for it is only those persons who are conversant with this extensive group as a whole who can, with any degree of certainty, pair many of the species.

Genus **AMAZILIA** REICHENBACH.

Amazilia REICH., Syst. Av., 1849, pl. 39. Type, *Orthorhynchus amazili* LESS.

Amazilis GRAY, Gen. B., I, 1840.—*Amazilius* BONAP., 1849.—*Amazillia*, SCL. and SALV., 1859.

Pyrhrophæna CAB. and HEINE, Mus. Hein., III, 1860, 35. Same type.

Hemithylaca CAB. and HEINE, Mus. Hein., III, 1860, 37. Type, *Trochilus nireoventris* GOULD.

Hemistilbon GOULD, Introd. Troch., oct. ed., 1861, 149. Type, *Amazilia ocai* GOULD.

Eranna HEINE, J. f. O. 1863, 187. Type, *Ornismya cinnamomea* LESS.

Eratina HEINE, J. f. O., 1863, 190, 191. Type *Trochilus iodurus* SAUCEROTT.

Ariana MULS. and VERR., Class. Troch., 1866, 36. Type, *Trochilus nireoventer* GOULD.

Leucodora MULS. and VERR., Hist. Nat. Ois.-Mouch., I, 1877, 309. Type, *Trochilus edwardi*, BOURC. and DELATTR.

Myletes (subgenus) MULS. and VERR., Hist. Nat. Ois.-Mouch., I, 1877, 284. Type, *Trochilus yucatanensis* CABOT.

Saucerottia BONAP., Compt.-Rend., 1850, 381. Type, *Trochilus saucerottii* BOURC. and DELATTR.

Erythronota GOULD, Intr. Troch., oct. ed., 1861, 16. *Ornismya erythronota* LESS.

Eratopis HEINE, J. f. O., 1863, 191. Type, *Trochilus cyanifrons* BOURC.

Erasuria HEINE, J. f. O., 1863, 191. Type, *Erythronota elegans* GOULD.

Lisaria MULS., Cat. Ois.-Mouch., 1875, 11. Type, *Hemithylaca warszewiczi* CAB. and HEINE.

GENERIC CHARACTERS.—Bill longer than head, straight; nostrils uncovered; wing normal; tail more than half as long as wing, emarginate, the feathers broad and rather stiff; tarsi densely feathered; under parts plain metallic green, plain cinnamon-rufous, or green anteriorly, and white, buff, or cinnamon-rufous posteriorly, the chest sometimes white; tail chestnut, purplish black, or blue-black; sexes alike.

Although the two dozen or more species which Mr. D. G. Elliot* has included in this genus have usually been distributed through a greater or less number of so-called genera, I am forced by a careful examination and comparison of the types of the several generic names given in the above synonymy to agree with the gentleman just mentioned in his reduction of these names to the rank of synonyms. *Amazilia ocai* Gould and *Erythronota elegans* Gould, I have not seen, but have little doubt that the names *Hemistilbon* Gould and *Erasuria* Heine, based upon them, respectively, are also synonyms of *Amazilia*. In fact, some

* Classification and Synopsis of the Trochilidae, pp. 216-226.

other groups of species* which even Mr. Elliot has allowed to stand as genera come so very close to *Amazilia* in their structural and other characters that it may prove necessary to refer them also to the last-named genus.

The twelve species of *Amazilia* (as recognized by Mr. Elliot) found between the United States and Panama may be distinguished by the following characters:

COMMON CHARACTERS.—Above green, bronze-green, or bronzy; the tail rufous, chestnut, bronzy, purple, or blue-black; lower parts green anteriorly or entirely light cinnamon; sexes alike.

*a*¹. Lower parts partly green.

*b*¹. Belly pure white.

*c*¹. Tail purplish black. *Hab.* Costa Rica to Panama.

A. nireoventer (GOULD). *White-bellied Humming Bird.*†

*c*². Tail deep bronze. *Hab.* Isthmus of Panama.

A. edwardii (DE LATT. and BOURC.). *Edward's Humming Bird.*‡

*b*². Belly not white.

*c*¹. Tail blue-black or dark steel-blue.

*d*¹. Secondaries entirely black or blue-black. *Hab.* Nicaragua and Costa Rica.

A. sophia (BOURC. and MULS.). *Sophia's Humming Bird.*§

*d*². Secondaries rufous-chestnut, tipped with blue-black. *Hab.* Guatemala and Nicaragua (Pacific side).

A. cyanura GOULD. *Blue-tailed Humming Bird.*||

*c*². Tail bronzy, purple, or chestnut.

*d*¹. Tail greenish bronze. *Hab.* Eastern Mexico.

A. ocai GOULD. *D'Oca's Humming Bird.*¶

*d*². Tail purple or chestnut.

*e*¹. Secondaries partly rufous.

*f*¹. Secondaries with more than basal half rufous; tail deep chestnut glossed with purple, the middle feathers purple. *Hab.* Southern Mexico.

A. beryllina (LICHT.). *Berylline Humming Bird.***

*f*². Secondaries with not more than basal half rufous; tail rich bronze-purple. *Hab.* Guatemala.

A. maria (BOURC.).†† *Maria's Humming Bird.*

*e*². Secondaries without any rufous.

*f*¹. Belly and flanks dull brownish gray; lores deep rusty. *Hab.* South-eastern Texas to Ecuador.

A. fuscicaudata (FRAS.). *Rieffer's Humming Bird.* (Page 366.)

* For example: *Agyrtia* REICH., *Uranomitra* REICH., *Eucephala* REICH., *Timolia* MULS., *Arinia* MULS., and *Callipharus* ELLIOT.

† *Trochilus* (—?) *nireoventer* GOULD, P. Z. S., 1850, 164. *Amazilia nireiventris* ELLIOT Class. and Synop. Troch., 1879, 222.

‡ *Trochilus edwardi* DE LATT. and BOURC., Rev. Zool., 1846, 308. *Amazilius edwardi* BONAP., Consp., I, 1850, 78.

§ *Trochilus sophia* BOURC. and MULS., Ann. Soc. Lyons, IX, 1846, 318. *Amazilius sophia* BONAP., Consp., I, 1850, 78.

|| *Amazilia cyanura* GOULD, Mon. Troch., pt. XVIII, 1850, pl. 12; vol. v, pl. 315.

¶ *Amazilia ocai* GOULD, Ann. Mag. N. 76, ser. 3, IV, 1859, 96; Mon. Troch., v, 1861, pl. 289.

** *Trochilus beryllinus* LICHT., Preis-Verz., 1830, No. 26. *Amazilia beryllina* GOULD, Mon. Troch. pt. XXII, 1861 (vol. v, 1861, pl. 312).

†† *Trochilus maria* BOURC., Ann. Soc. Ag. Lyon, IX, 1846, 319. *Amazilia maria* ELLIOT, Class. and Synop. Troch., 1879, 222.

*f*². Belly and flanks cinnamon-rufous or pale cinnamon; lores not distinctly rusty.

*g*¹. Belly and flanks deep cinnamon-rufous. *Hab.* Yucatan.

A. yucatanensis (CABOT). *Cabot's Humming Bird*.*

*g*². Belly and flanks pale cinnamon or cinnamon-buff. *Hab.* Eastern Mexico, north to southeastern Texas.

A. cerviniventris GOULD. Buff-bellied Humming Bird. (Page 364.)

*a*². Lower parts entirely cinnamon.

*b*¹. Smaller (wing 2.15–2.25, exposed culmen 0.80–0.88). *Hab.* Western Mexico and Yucatan to Nicaragua.

A. cinnamomea (LESS.) *Cinnamomeus Humming Bird*.†

*b*². Larger (wing 2.50–2.70, exposed culmen 0.90–1.05). *Hab.* Tres Marias Islands, western Mexico. *A. graysoni* LAWR. *Graysons Humming Bird*.‡

BUFF-BELLIED HUMMING BIRD. *Amazilia cerviniventris* GOULD.

Amazilius cerviniventris GOULD, P. Z. S., 1856, 150.

Amazilia cerviniventris GOULD, Mon. Troch., pt. XIII, 1857, pl. 12; vol. v, 1861, pl. 309.—MERRILL, Bull. Nutt. Orn. Cl., II, Jan. 1877, 26 (Ft. Brown, Texas).

Amazilia yucatanensis MERRILL and RIDGW., Pr. U. S. Nat. Mus., I, 1878, 148 (Ft. Brown, Texas; not *Trochilus yucatanensis* CABOT).

Fawn-breasted Amazili (GOULD).

Rufous-bellied Humming Bird (COUES).

L'Amazili à ventre de biche (MULSANT and VERREAUX).

Chupamirto de pecho verde y vientre castaño (D'OCA).

RANGE.—Eastern Mexico, north to the lower Rio Grande Valley, in Texas.

SP. CHAR.—*Adult (both sexes)*: Lores greenish or dull brownish (never rusty); belly and flanks pale dull cinnamon-buff; upper parts metallic bronze or bronze-green, the upper tail-coverts somewhat tinged with rusty on basal portion; tail rufous-chestnut (glossed with purple on the under surface), the feathers broadly tipped and margined terminally with metallic bronze; some specimens (immature specimens only?) with a considerable blackish subterminal space on one or both webs of all but the middle pair of feathers; chin, throat, and chest brilliant metallic Paris-green; breast metallic bronze-green; bill reddish (light brownish in dried skins), blackish terminally; length about 4.00–4.50; wing, 2.15–2.25; tail, 1.35–1.60, slightly emarginated; exposed culmen, 0.75–0.82. *Young* similar to adult, but upper mandible black, upper tail-coverts broadly margined with rusty, and tail-feathers (except middle pair) with a more or less extensive subterminal space of blackish on one or both webs, the median portion, however, including shaft, chestnut.

Adult male (No. 90749, Fort Brown, Texas, Dr. J. C. Merrill, U. S. Army): Above metallic green, tinged with bronze, the top of the head very much duller; upper tail coverts bronze-green, their basal portion

* *Trochilus yucatanensis* CABOT, Proc. Nat. His. Soc., Bost., 1845, 74. *Amazilia yucatanensis* GOULD, Mon. Troch. pt. XXIII, 1861 (vol. v, 1861, pl. 308).

† *Ornismya cinnamomea* LESS., Rev. Zool., 1842, 175. *Amazilia cinnamomea* ELLIOT, Class. and Synop. Troch., 1879, 219.

‡ *Amazilia (Pyrrhophæna) graysoni* LAWR., Ann. Lyc. N. Y., 1867, 404.

(partially exposed) dull cinnamon-rufous; tail clear chestnut, the two middle feathers broadly greenish bronze at tips (for about .28 of an inch along shaft and for a much greater distance along edges); rest of the tail-feathers similarly tipped with bronze, but this color gradually decreasing in extent to the outer pair, on the inner web of which the bronze is reduced to a very small angular space next to the terminal portion of the shaft; under surface of tail faintly glossed with purple; remiges dull brownish slate or dusky, faintly glossed with purplish. Sides of head metallic green, like hind neck, etc.; chin, throat, and chest brilliant metallic Paris-green; breast metallic bronze-green (extending farthest back laterally), the bases of the feathers dull grayish cinnamon; belly and flanks light, buffy cinnamon, the under tail-coverts vinaceous-cinnamon; downy femoral tufts white; short dense feathers clothing thighs and upper part of tarsus dull white, tinged with pale buffy-grayish. Upper mandible pale brown (reddish in life?), tipped with blackish for about 0.15 of an inch; lower mandible similar, but paler. Length (skin), 4.00; wing, 2.25; tail, 1.50, middle feathers 0.20 shorter; exposed culmen, 0.80.

Young male (No. 74337, Fort Brown, Texas, August 23, 1877; Dr. J. C. Merrill): Generally similar to the adult as described above, but upper parts much more golden bronze-green, feathers of lower back and rump margined terminally with dull light rusty and upper tail-coverts broadly margined with light rusty; middle tail-feathers with outer webs wholly dull metallic bronze, the terminal portion of both webs copper-bronze; other tail-feathers marked subterminally with purplish black, this reduced on outer feather to an edging to outer web, but on next to the middle pair occupying the greater portion of both webs near the tip; top of head dull blackish brown, passing into dull rusty brown laterally. Throat and chest not continuously brilliant green, but this color interspersed with patches of dull buffy and grayish-brown feathers. Upper mandible black, becoming brownish at base; lower pale brownish, blackish at tip.

Young female (No. 74339, same locality and collector, date not given): Similar to the young male as described above, but back, etc., purer (less bronzy) green, middle pair of tail-feathers wholly bronze (darker and more coppery terminally), purplish black subterminal spaces to other tail-feathers much more extensive and more distinct, belly and flanks much duller and grayer buffy, and only the basal half of the under mandible light colored.

This bird is so closely related to the *A. yucatanensis* (Cabot) of Yucatan that there is a strong probability that it will prove to be merely a race of the same species. Although the type of *A. yucatanensis* exhibits some characters of plumage which I have not been able to recognize in any of the examples of *A. cerviniventris* which I have been able to examine,* additional specimens show these differences to be incon-

* See Proceedings of the U. S. National Museum, Vol. IV, pp. 25, 26.

stant and therefore not diagnostic, thus reducing the differential characters of the two forms to the coloration of the under parts alone, *A. yucatanensis* having the breast, belly, sides, flanks, and under tail-coverts much deeper in color, or a clear deep cinnamon-rufous, the absence of any distinct wash of bronze green on the sides of the breast rendering the contrast between the brilliant green of the throat and chest and the cinnamon-rufous color which follows it much more abrupt and conspicuous.

The Buff-bellied Humming Bird, the plainest species of the family that has hitherto been added to our fauna, was first obtained within our limits by Dr. J. C. Merrill, U. S. Army, at Fort Brown, Texas, in 1876. It was there an abundant summer visitor, being particularly numerous on the military reservation. It seemed to be perfectly at home among the dense tangled thickets, darting rapidly among the bushes and creeping vines, and was so active that specimens were obtained with difficulty. It was rather a noisy bird, its shrill cries usually first attracting attention to its presence.*

Mr. George B. Sennett met with it at the same place the following year, but only obtained one specimen, which was shot while hovering over wild flowers near the ground, among cacti and low bushes.†

I am unable to add anything further regarding its habits.

RIEFFER'S HUMMING BIRD. *Amazilia fuscicaudata* (FRASER).

(Plate XLIII.)

Trochilus fuscicaudatus FRAS., P. Z. S., 1840, 17 (Ecuador).

Amazilia fuscicaudata MERRILL and RIDGW., Pr. U. S. Nat. Mus., I, Oct., 1878, 147 (Fort Brown, Texas).

Trochilus riefferi BOURC., Ann. Sci. Phys. et Nat. Lyon, 1843, 45.

Amazilia riefferi REICH., Av. Syst. Nat., 1849, pl. 39.—GOULD, Mon. Troch., pt. XIX, 1860, pl. 14; vol. v, 1861, pl. 311.

Pyrrhophana riefferi CAB. and HEINE, Mus. Hein., III, 1860, 36.—MERRILL, Bull. Nutt. Orn. Cl., I, Nov., 1876, 88 (Fort Brown, Texas).

Rieffer's Amazili (GOULD).

Dusky-tailed Humming Bird (COUES).

L'Ariane de Rieffer (MULSANT and VERREAUX).

RANGE.—The whole of Central America and eastern Mexico; north to the lower Rio Grande Valley in Texas; south to Ecuador.

SP. CHAR.—Lores rusty; breast and belly pale brownish gray; upper parts metallic bronze-green, darker on top of head, more bronzy or golden on rump; tail deep chestnut, including middle feathers, the feathers tipped and margined more or less extensively with bronze or purplish; throat and chest brilliant metallic yellowish green, the feathers pale grayish beneath the surface, showing wherever the feathers are disarranged; sides and flanks bronze-green; under tail-

* Pr. U. S. Nat. Mus., Vol. I, 1879, pp. 149, 150.

† Bull. U. S. Geol. & Geog. Surv. Terr., Vol. IV, No. 1, p. 36.



RIEPPER'S HUMMING BIRD (*Amazilia fuscicaudata*).

Male. (Cat. No. 50370, U. S. N. M. Guatemala City, Guatemala. Collected by Dr. Van Patten.)

coverts chestnut-rufous; anal and femoral downy tufts white; bill reddish at base for a greater or less distance (brownish in dried skins), the terminal portion black; length (skins), about 3.80-4.35; wing, 2.00-2.40; tail, 1.45-1.70; exposed culmen, 0.70-0.90. *Adult female* similar to the male, but usually more or less duller in color. *Young* similar to adults, but plumage duller, the rump more tinged with rusty, and the head washed with rusty.

Adult male (No. 50370, Guatemala City, Guatemala; Dr. Van Patten): Above metallic bronze-green, more decidedly bronzy, but also darker and duller, on top of head, the rump inclining to golden bronze; upper tail-coverts and tail, including middle pair of feathers, chestnut, the latter glossed with purple (especially underneath), and each feather broadly margined terminally with deep bronze, this color also edging the outer webs; remiges dull brownish slate or dusky, faintly glossed with purplish. Lores deep rusty; chin, malar region, throat, and chest brilliant metallic yellowish green, somewhat broken by the light grayish brown basal portion of the feathers here and there exposed; sides and flanks metallic bronze-green; median portion of breast and belly light grayish brown; femoral and anal tufts white; under tail-coverts light chestnut. Upper mandible brown (reddish in life), tipped and edged with blackish; under mandible brownish white (red or flesh-colored in life), with tip dusky; feet dusky. Length (skin), 3.80; wing, 2.30; tail, 1.40 (middle feathers 0.05 shorter); exposed culmen, 0.78.

Adult female (No. 38987, Panama, January 7, 1865; Fred. Hicks): Similar to the male, as described above, but tail and its coverts rather lighter chestnut; belly much lighter brownish gray, and bill more extensively dusky. Length (skin), 3.80, wing, 2.10; tail, 1.35; exposed culmen, 0.85.

Young female (No. 40452, San Juan, Nicaragua, June 7, 1865; H. E. Holland): Similar to the adult, but duller green above, with feathers of the lower back and rump broadly margined with rusty; anterior lower parts with green much less brilliant and much interrupted by dull brownish gray, approaching grayish white on the chin. Upper mandible entirely blackish.

With very numerous specimens before me, representing various localities, from eastern Mexico to Bogota, I am unable to discover any constant differences coincident with locality, even in specimens from the most remote districts. There is a considerable range of individual variation, involving the amount of blackness of the maxilla (some specimens having the upper mandible wholly blackish except the extreme base, while in others only the end is dark-colored), length of wing and bill, etc. These differences, however, appear to be purely individual, and not at all, so far as I can see, local. Some Costa Rican specimens are the largest in the collection, as well as the darkest in color, but there is much variation in both respects in a series of 8 examples from that country.

A specimen from Guayaquil, Ecuador, however, (No. 54961, Dr. Des-truge) labeled by M. Lawrence "*riefferi* var. *jacunda*," on the other hand, differs decidedly from all more northern examples, including those from Colombia, in the very much lighter color of the tail-coverts, tail, and abdomen, the latter being very nearly white, instead of brownish gray or grayish brown.

Like the allied Buff-bellied Humming Bird, Rieffer's Humming Bird was first taken within the United States by Dr. J. C. Merrill, U. S. Army, who examined a living specimen brought to him by a soldier at Fort Brown, but which subsequently escaped. Fortunately, however, Dr. Merrill had taken a careful description of the bird while in his possession, so there can be no question as to the correct identification of the species.

But little has been recorded of the habits of this species, the following, from Gould's monograph, being all that I have been able to find:

Mr. Bridges found it feeding on a Malvaceous plant near the Boqueti, at an elevation of 4,000 feet; Mr. Salvin met with it at Coban in November, and also near Bezbál, and remarked that it was far from common at Coban, and that all the specimens he procured appeared to be males; and Mr. Fraser noticed it feeding from the bark of a large tree in the forest of Babahoyo in Ecuador, and states that when he arrived in Esmeraldas in October it was by no means uncommon, feeding morning and evening around the caves of the house; in November it was very scarce, and in December not to be seen.

GENUS *BASILINNA* BOIE.

Basilinna BOIE, Isis, 1831, 546. Type, *Trochilus leucotis* VIEILL.

Heliopadica GOULD, Mon. Troch., pt. XV, 1858. Type, *Trochilus melanotis* SWAINS., = *T. leucotis* VIEILL.

GENERIC CHARACTERS.—Similar to *Amazilia*, but bill broader, and more denuded at the base, the frontal apex being considerably posterior to the mental apex, and sexes very different in coloration.

This genus is so closely related to *Amazilia* that the sexual difference in coloration is the most obvious difference. Only two species are known, their diagnostic characters being as follows:

COMMON CHARACTERS.—Above metallic green, darker or duller on top of head; tail mainly chestnut or blackish, the middle feathers, however, with more or less green; a broad and very conspicuous white stripe behind eye, with a black, dusky, or brownish one immediately beneath it, across ear-coverts. *Adult males* with forehead and chin black or deep blue, the throat and upper part of chest brilliant metallic green. *Adult females* with top of head dull brownish (sometimes tinged with green), and lower parts pale cinnamon (with or without green spots on throat) or dull grayish white with sides green.

*a*¹. Tail mainly chestnut; posterior lower parts pale cinnamon. *Adult male*: Forehead and chin opaque black, or dull blue-black; middle tail-feathers chestnut centrally, metallic green exteriorly, the rest without dusky subterminal bar or spot. *Adult female*: Lower parts pale cinnamon, with or without green spots on throat; middle tail-feathers entirely green, the rest marked by a more or less distinct subterminal spot of dusky. *Hab.* Southern portion of Lower California. *B. xantusi* (LAWR.). *Xantus's Humming Bird.* (Page 369.)

*a*². Tail mainly blackish: posterior lower parts dull whitish, mixed with grayish brown and greenish. *Adult male* with forehead and chin deep rich blue; middle tail-feather entirely metallic green or bronze, the others tipped with green or bronzy. *Adult female*: Lower parts dull light grayish, or grayish white, more or less spotted with green, the sides almost continuously of this color; middle tail-feathers entirely green or bronzy, the others black, the two or three outer ones tipped with dull grayish. *Hab.* Highlands of Guatemala and Mexico. *B. leucotis* (VIEILL.). *White-eared Humming Bird*.³

XANTUS'S HUMMING BIRD. *Basilinna xantusi* (LAWR.).

(Plate XLIV.)

Amazilia xantusi LAWR., Ann. Lyc. Nat. Hist. N. Y., VII, April, 1860, 109 (female).

Heliopadica xantusi GOULD, Mon. Troch., pt. XXI, 1861, pl. 2; vol. II, 1861, pl. 65.—COOP., Orn. Cal., I, 1870, 365.—B. B. and R., Hist. N. Am. B., II, 1874, 467, pl. 47, fig. 3.

Basilinna xanthusi ELLIOT, Class. and Synop. Troch., 1879, 227.

Basilinna xantusi RIDGW., Pr. U. S. Nat. Mus., III, 1880, 6, 188.

Heliopadica castaneocauda LAWR., Ann. Lyc. Nat. Hist. N. Y., VII, Apr., 1860, 145 (male).—ELLIOT, Illustr. B. N. Am., I, 1869, p. XXII.

Le Coeligène de Xanthus (MULSANT and VERREAUX).

Chupamirto de pico coral y vientre castaño (D'OCA).

RANGE.—Cape district of Lower California.

SP. CHAR.—Tail mainly chestnut; posterior under parts pale cinnamon-rufous. *Adult male* with forehead and chin opaque black or dull blue-black, throat and chest brilliant metallic yellowish green, and a broad, white stripe behind eye; length (skins), about 3.40–3.60;† wing, 1.95–2.15; tail, 1.35–1.40; exposed culmen, 0.65–0.70. *Adult female* without any black about head, the white post-ocular stripe less distinct, and the entire under parts light cinnamon-rufous; length (skins), about 3.10–3.50;‡ wing, 1.85–2.00; tail, 1.15–1.25; exposed culmen, 0.60–0.70.

Adult male (No. 117767, Miraflores, Lower California, November 29, 1859; J. Xantus):§ Forehead slightly glossy blue-black, changing gradually into duller blackish on the crown; chin and a broad stripe thence beneath eye to ear-coverts opaque, velvety black; lores dull grayish white; behind the eye a distinct stripe of white, changing into light cinnamon-grayish on side of neck; occiput, hind-neck, wing-coverts, scapulars, and back, metallic bronze-green; upper tail-coverts bronze-green mixed with rusty; tail chestnut, faintly glossed with purple on under surface, the middle pair of feathers broadly margined with metallic bronze green; remiges dusky brownish slate, very faintly glossed with purplish. Throat and upper part of chest brilliant metallic yellowish emerald-green or Paris green; feathers of lower chest and breast

* *Trochilus leucotis* VIEILL., Nouv. Dict., ed. 2, XXII, 1818, 428. *Basilinna leucotis* REICH., Aufz. der Colib., 1853, 13.

† Length of a specimen before skinning said to be 4.75.

‡ Length before skinning said to be 3.30–3.65.

§ Type of *Heliopadica castaneocauda*, LAWR.

H. Mis. 129, pt. 2—24

metallic bronze-green terminally, light cinnamon-rufous basally; rest of under parts light cinnamon-rufous, the anal region and under tail-coverts paler. Bill with basal half or more pale brownish (coral-red in life), the terminal portion blackish. Length (skin), 3.40; wing, 2.05; tail, 1.40; the middle feathers, about 0.10 shorter; exposed culmen, 0.65.

Adult female (No. 16935, Cape St. Lucas, Lower California, October 1859; J. Xantus):* Sides of forehead dull cinnamon-rufous; median portion of forehead, with crown, dull grayish brown; rest of upper parts, including middle pair of tail-feathers, metallic bronze-green, the upper tail-coverts margined and somewhat mixed with rusty; tail-feathers (except middle pair) chestnut, becoming gradually paler on the outermost, the second and third (from the middle) with a large blackish longitudinal subterminal spot on each web, the fourth with a similar spot on the inner web and a trace of such a spot on the outer; outermost feather without any spot on the outer web, and with a mere speck of blackish on the inner web; remiges dull brownish slate or dusky, faintly glossed with purplish. A distinct stripe of buffy whitish behind eye, above upper margins of the ear-coverts, the latter dusky grayish brown; chin, throat, and other lower parts dull cinnamon-rufous, becoming paler and somewhat mixed with whitish posteriorly. Upper mandible black, becoming more brownish at base; lower pale brownish (reddish in life), with blackish tip. Length (skin), 3.10; wing, 1.85; tail, 1.20, the lateral feathers about 0.10 shorter; exposed culmen, 0.60.

Among adult males the principal variation in color affects the green of the throat, which may be a decidedly yellowish green or a nearly pure emerald-green, and the extent of bronze-green on the middle tail-feathers, which sometimes covers the entire outer web and the greater part of the inner web also.

Adult females obtained during midsummer are much paler, the color of the lower parts being a dull grayish buff, and the post-ocular stripe quite white.

A specimen, labeled "Mazatlan, Mexico" (No. 24853, J. Xantus), is similar to Lower California specimens and is doubtless not from the ascribed locality.

What appears to be an adult female, but may be an immature male (No. 24855, Cape St. Lucas, April, 1860, J. Xantus), differs from the usual plumage of the adult female in having a quite extensive patch of metallic yellowish green covering nearly the whole of the throat, and some blackish feathers in the region extending from the side of the chin to the ear-coverts.

What little we know of the habits of Xantus's Humming Bird is due to Mr. L. Belding who observed it at several localities in the southern part of Lower California, where he informs us it is a mountain-loving species, and usually to be found near fresh water, while in winter he found it only in the mountain cañons. "It was common at the western

* Type of *Amazilia xantusi*, LAWR.



XANTUS'S HUMMING BIRD (*Basilinna xantusi*).

Male. (Cat. No. 113101, U. S. N. M. Pierce's Ranch, Lower California. Collected by M. A. Frazar.)

Female. (Cat. No. 113104, U. S. N. M. Pierce's Ranch, Lower California. Collected by M. A. Frazar.)

Nest. (Cat. No. 18563, U. S. N. M. San José, Lower California. Collected and presented by L. Belding.)

base of Cacachiles Mountain in February; more so, in fact, than *C. costae*. It was not observed at San José until some time after my arrival, though it occurred in cañons only 2 or 3 miles to the westward. About the last of April it was common in orchards at San José.

"While incubating, this species is very confiding and courageous, sometimes remaining upon the nest until removed from it by the hand. A nest taken April 23 was placed underneath an awning or shade of boughs and weeds in front of a farmhouse. It was surrounded by downy heads of composite plants and could scarcely be distinguished from them, having as usual, been made of raw cotton."

The two nests of this species obtained by Mr. Belding are very neat structures, quite different in appearance from the nest of any other North American Hummer, though they differ much from one another. The finer of the two (No. 18563, San José, April 23,) is a compactly felted mass composed chiefly of raw cotton, but this coated exteriorly with spiders' webs and light brown fine fibrous materials. It is securely fastened to two forks of a twig and rests between them. The shape is very irregular, owing to the manner in which it is secured to the twigs, but on top the transverse diameter is about 1.50 inches, the cavity being about 1 inch across and about 0.60 of an inch deep. The two eggs measure respectively 0.32 by 0.50 and 0.34 by 0.49, being essentially identical in size and shape with those of *Calypte costae*, from which it is apparently quite impossible to distinguish them. The other nest (No. 18564, Arroyo, north of Santiago Peak, May 9) is quite different both in shape and material. It is very regularly but shallowly cup-shaped, averaging a little over 1.50 inches in external diameter, but only about 0.80 of an inch in extreme height. The cavity is about 1 inch across by a little over 0.50 of an inch in depth. The material is chiefly raw cotton, but this much mixed, especially outwardly, with fine leaf-stems, seed-capsules, spiders' webs, etc., besides one or two soft white feathers. Like the other nest, this one is supported between two twigs. The eggs measure respectively 0.34 by 0.49 and 0.32 by 0.50.

Genus **IACHE** ELLIOT.

Circe GOULD, Mon. Troch., pt. XIII, May 1, 1857. Type, *Cyananthus latirostris* SWAINS. (Preoccupied; Mert., 1835, Acal.)

Iache ELLIOT, Class. and Synop. Troch., March, 1879, 234. Type, *Cyananthus latirostris* SWAINS.

GENERIC CHARACTERS.—Similar to *Chlorostilbon* GOULD,* but bill longer. Bill decidedly longer than head, nearly or quite straight, the nostrils entirely uncovered by feathers, though overhung by a conspicuous operculum; the length of the exposed culmen equaling or exceeding the distance from the bend of the wing to the tips of the longest secondaries; tail deeply emarginate, the longest (lateral) feathers

* *Chlorostilbon* GOULD, Mon. Troch., pt. v, 1853; Introd. Troch., oct. ed., 1861, 175. Type, *Trochilus pucherani* BOURC. and MULS.

about equal in length to the distance from the tips of the longest secondaries to that of the longest primary, the shortest (middle) feathers less than half as long as the wing. (Female with lateral rectrices shorter, and tail therefore less deeply emarginated.) *Adult males* metallic grass-green above, the tail-feathers blue black with dull gray tips (broadest on middle feathers); downy thigh tufts pure white; under tail-coverts with more or less of white; rest of lower parts metallic green, bluish green, or blue; bill pale brownish (red in life) on basal portion, blackish at end. *Adult females* metallic grass-green above, pale grayish beneath, the two exterior tail-feathers tipped with pale brownish gray, and all with the basal half green.

This genus comes so very close to *Chlorostilbon* that I am unable to give satisfactory characters for its separation; indeed, some of the Central American species of *Chlorostilbon* resemble the species of *Iache* quite as much, both in coloration and form, as the type of the former genus (*C. pucherani*). In fact, I am unable to see why the two so-called genera, together with *Riccordia* REICH.,* of the Bahamas, Cuba, Haiti, and Porto Rico, should not be merged into one genus.

The number of species embraced in the so-called genus *Iache* is very uncertain, only two of the five which have been described possessing very definite characters. I have at this moment before me the types of *I. magica* (Muls. and Verr.) and *I. doubledayi* (Bourc.), besides typical specimens of *I. lawrencei* Berl., a good series of *I. latirostris* (Sw.), and a fine adult male of what should be, from the locality, the *I. nitida* of Salvin. The five names above mentioned belong to two quite distinct groups, *I. magica* and *I. lawrencei* being closely related to *I. latirostris*, while *I. nitida* is allied to *I. doubledayi*. Of the latter group I have only three specimens for comparison, all adult males, as follows: The type of *I. doubledayi*, kindly lent by the American Museum of Natural History in New York City; a specimen from Tehuantepec, collected by Professor Sumichrast (No. 57794, U. S. National Museum), and referred by Mr. Lawrence to *I. doubledayi*; and a most perfect example collected by Mr. O. T. Baron, at Dos Arroyos, State of Guerrero, Mexico, the region from which Mr. Salvin's recently described *I. nitida* was obtained. These three specimens are so much alike, however, that I have little hesitation in referring them to one species, especially the first and last, the Tehuantepec specimen being much more different from the other two than they are from one another. I am therefore not able to decide, without more specimens, how many forms of the *doubledayi* group should be recognized, but would not be much surprised if *I.*

* *Riccordia* REICH., Aufz. der Colib., 1853, 10. Type, *Trochilus riccordi* GERV.—*Sporadinus* BONAP., Rev. et Mag. Zool., 1854, 255. Same type.

This so-called genus embraces four species, as follows: *R. riccordi* (GERV.), of Cuba and two of the Bahama islands (Andros and Abaco); *R. bracei* (LAWR.) from New Providence, Bahamas; *R. elegans* (VIEILL.), from Haiti, and *R. mangai* (VIEILL.), from Porto Rico.

nitida would eventually prove to be merely a variation of *I. doubledayi*, and not a distinct species.

The males of the several forms may be distinguished as follows, the females of all except *I. latirostris* and *I. nitida* being unknown to me:

*a*¹. Tail forked for only one-fourth its total length; exposed culmen more than .70.

*b*¹. Upper parts bronze-green; bill larger and broader at base.

*c*¹. Under tail-coverts white, with dull grayish central spaces, entirely white in young; whole throat metallic blue. *Hab.*, Western and central Mexico, north to southern Arizona.

I. latirostris (SWAINS.). *Circe Humming Bird* (Page 373).

*c*². Under tail-coverts dusky grayish, glossed with green, margined with grayish white; throat metallic green, tinged with blue toward chin. *Hab.* Tres Marias Islands, western Mexico.

I. lawrencei BERL. *Lawrence's Humming Bird* *

*b*². Upper parts purplish copper-bronze; bill smaller and narrower (exposed culmen less than 0.75, width at base not over 0.12). *Hab.*, Western Mexico (vicinity of Mazatlan). *I. magica* (MULS. and VERR.). *Magic Humming Bird*.†

*a*². Tail forked for much more than one-fourth its total length; exposed culmen less than 0.70.

*b*³. Under parts, except throat, metallic bluish green; top of head metallic emerald-green, inclining to blue on forehead. *Hab.*, Southwestern Mexico (Dos Arroyos, Guerrero; "Chimantla").

I. doubledayi (BOURC.). *Doubleday's Humming Bird*.‡

*b*⁴. Under parts metallic blue, the throat more purplish blue; top of head metallic blue, more greenish posteriorly. *Hab.*, Southwestern Mexico (Sierra Madre of Guerrero; Chihuítan, Tehuantepec).

I. nitida SALV. *Shining Humming Bird*.§

CIRCE HUMMING BIRD. *Iache latirostris* (SWAINS.).

(Plate XLV.)

Cynanthus latirostris SWAINS., *Philos. Mag.*, I, 1827, 441.

Circe latirostris GOULD, *Mon. Troch.*, pt. XIII, 1857, pl. 7; vol. v, 1861, pl. 338.—

HENSH., *Am. Sportsm.*, v, Feb. 20, 1875, 328 (Chiricahua Mountains, Arizona); Zöhl. *Wheeler's Exp.*, 1875, 380.

Iache latirostris ELLIOT, *Class. and Synop. Troch.*, 1879, 235.

Circe (GOULD).

Broad-billed Humming Bird.

La Circe à large bec (MULSANT and VERREAUX).

Chupamirto matraquita (D'OCA).

RANGE.—Western and central Mexico, north into southern Arizona.

SP. CHAR.—*Adult male*, metallic bronze-green above, much duller on top of head, and on upper tail-coverts; tail blue-black, the middle feathers tipped with brownish gray; chin and throat bright metallic blue, rest of under parts metallic green, the under tail-coverts white, with or without grayish or greenish central spots; bill reddish basally (brownish in

* *Iache lawrencei* BERL., *RIDGW.*, *Man. N. Am. B.*, 1887, 320.

† *Hylocharis magica* MULS. and VERR., *Ann. Soc. Lyon*, XVIII, 1872, 110.—*Iache magica* ELLIOT, *Class. and Synop.*, *Troch.*, 1879, 235.

‡ *Trochilus doubledayi* BOURC., *P. G. S.*, 1874, 46.—*Iache doubledayi* ELLIOT, *Class. and Synop. Troch.*, 1879, 235.

§ *Iache nitida* SALV., *Ibis*, April, 1889, 240.

dried skins), black terminally; length, dried skins, 3.40–3.65; before skinning, 3.75–4.10; * wing, 1.95–2.08; tail, 1.20–1.35 (forked for 0.25–0.40), exposed culmen, 0.75–0.87. *Adult female*, metallic green, or bronzy-green above, becoming dull brownish gray on forehead; middle tail-feathers metallic green or bluish green, usually shaded with blue-black terminally or subterminally, the other tail-feathers greenish basally, then blue-black, their tips brownish gray (much broadest on exterior feather); lower parts light brownish gray, more or less washed with metallic green on sides of breast; a white spot or short streak behind eye; length, dried skins, about 3.25–3.40; before skinning, about 3.95 †; wing, 1.90–2.10; tail, 1.15–1.20 (forked for about 0.12–0.25); exposed culmen, 0.75–0.87.

Adult male (No. 99218, Santa Rita Mountains, Arizona, June 28, 1884; E. W. Nelson): Above metallic grass-green (some of the feathers tinged with bluish green in certain lights), the forehead much duller; remiges dull brownish slaty, very faintly glossed with purplish; upper tail-coverts metallic bluish green; tail glossy blue-black, the four middle feathers tipped with dull brownish gray, this about .10 of an inch wide on middle pair. Chin and throat rich metallic cobalt-blue, gradually changing posteriorly to metallic bluish grass-green, which color covers uniformly the chest, breast, belly, sides, and flanks; thigh tufts pure white; under tail-coverts white on edges (broad), pale brownish gray medially. Bill light brownish (red or flesh-colored in life), about the terminal third blackish; feet dusky. Length, dried skin, 3.50; wing, 2.05; tail, 1.30 (forked for 0.25); exposed culmen, 0.87.

Adult female (No. 111646, Tucson, Arizona, April 22, 1884; E. W. Nelson): Above metallic green, glossed with bronze, changing to dull brownish gray on top of head, and to a more bluish green on upper tail-coverts and two middle tail-feathers; outer tail-feathers brownish gray, crossed by a broad subterminal band of blue-black, about .30 of an inch wide along shaft and removed about the same distance from the tip; the terminal gray space somewhat paler than the basal one; next feather has the basal gray space glossed with bluish green and the terminal gray space much reduced in size, forming a triangular spot; third feather has the basal portion metallic bluish green, and the terminal gray spot still smaller; fourth similar, but with merely a slight terminal edging of grayish; remiges dusky brownish slate, very faintly glossed with purplish. Chin, malar region, throat, chest, breast, belly, sides, and flanks plain light brownish gray, the sides of the breast washed with metallic green and the flanks tinged with brownish; under tail-coverts white, the shorter feathers tinged with brownish gray. An oblique broad postocular streak of dull white, immediately above the ear-coverts, the latter dusky. Upper mandible black; lower brownish

* Extent of wings, 4.98–5.05.

† Extent of wings, 5.05.



CIRCE HUMMING BIRD (*Iache latirostris*).

Male. (Cat. No. 99219, U. S. N. M. Santa Rita Mountains, Arizona. Collected by E. W. Nelson.)

Female. (Cat. No. 99220, U. S. N. M. Santa Rita Mountains, Arizona. Collected by E. W. Nelson.)

Nest. (Cat. No. 17890, U. S. N. M. Guanajuato, Mexico. Collected and presented by Prof. A. Dugès.)

(reddish in life), tipped with dusky. Length, skin, 3.50; wing, 2.05; tail, 1.20 (forked for about 0.12); exposed culmen, 0.87.

Young male, transition plumage (No. 99730, Arizona; E. W. Nelson): Above metallic green (much duller than in the adult), the feathers of the lower back and rump and the upper tail-coverts indistinctly margined at tips with dull pale brownish; tail as in adult male; under parts as in adult female, but chin, throat, and malar region inclining to light broccoli-brown, the latter interspersed with metallic greenish blue feathers (of the adult livery), the chest also mixed with metallic green feathers.

Young female (No. 72536, Santa Rita Mountains, Arizona, Aug. 24, 1874; H. W. Henshaw): Similar to the adult female, but feathers of the back, rump, etc., margined terminally with pale brown, these edgings most distinct posteriorly; under parts tinged with light brown, especially the chin, malar region, and throat.

Among adult males the principal variation is in the coloration of the under tail-coverts, which may be white, with the anterior or shorter feathers merely shaded with pale brownish gray, or marked with distinct median spaces of deep brownish gray, an intermediate coloration being the rule. The color of the throat varies slightly in the shade of the blue, which sometimes has a more decided greenish cast, and the upper tail-coverts may be of the same color as the back or of a decidedly darker and duller hue.

The specimens examined are from the valley of Mexico, the plains of Colima, the vicinity of Mazatlan, and southern Arizona.

The Circe Humming Bird is a common species of western and central Mexico and is a more or less common summer resident in suitable portions of southern Arizona, where it was first found in the Chiricahua Mountains, in 1874, by Mr. H. W. Henshaw, and where, both in the original and other localities, it has subsequently been found by other collectors.

It was next met with in the Santa Rita Mountains by Mr. F. Stephens, as recorded by Mr. Brewster in *The Auk*, vol. VII, 1882, p. 211; then in the Santa Catalina range by Mr. W. E. D. Scott, in 1884.

Of this curious rather than beautiful Humming Bird [says Mr. Henshaw*] three specimens were secured in the Chiricahua Mountains, at a point a few miles distant from Camp Crittenden. As the breeding season was entirely passed, I was able to note nothing concerning its habits which served to distinguish it from others of the family, save what appeared to be a constant habit of frequenting the agaves; and all the specimens were shot as they were flying about these peculiar plants, in the neighborhood of which I am confident I saw several others. Great numbers of this species are found in Mexico; and, as they there inhabit the mountains and tablelands, the species doubtless extends in summer through northern Mexico, and finds in the extreme southern parts of Arizona a suitable climate; while an abundance of the agave, to which plants it resorts in its more tropical home for at least a great portion of its subsistence, serves as a further attraction. No doubt these hummers are quite numerous in the locality I have referred to earlier in the season, as well as in other similar places.

* *Zoölogy of Wheeler's Survey*, 1875, p. 381.

Mr. F. Stephens subsequently found the Circe Humming Bird in the Santa Rita Mountains, where five specimens were obtained and others seen. They were always found near water, and usually along the streams which flowed through cañons, high among the mountains. They seemed to prefer sycamores to other trees, and invariably perched on dead twigs where they could command an open view. Their notes were flat and differed from those of other Hummers.*

The Santa Catalina Mountains were afterward added to their range by Mr. W. E. D. Scott, who thus records his observations:

During the spring, summer, and early fall of 1884 this was a rather common species in the Catatina Mountains, from an altitude of 3,500 to 5,000 feet, but in the corresponding season of 1885 the birds were apparently rare. The birds arrive at this point early in April, the 5th of that month being my earliest record, when I took two adult males. They remain throughout the spring and summer, leaving from the middle to that last of September. I took an adult female on June 26, 1884, that contained an unlaidd egg with shell nearly formed, so that there can be but little doubt that the birds breed at this point. Besides, I have the young birds in first plumage from July 1 until late in August.†

SPECIES WHICH HAVE BEEN WRONGLY ADMITTED TO THE NORTH AMERICAN FAUNA, OR WHICH ARE PURELY ACCIDENTAL STRAGGLERS.

The following species have been given in works on North American birds, but are properly not entitled to a place in our fauna. One of them (*Atthis heloisa*), being a bird of eastern Mexico, will doubtless yet be found in southern Texas, but the other two belong to regions far beyond our limits.

Genus **LAMPORNIS** SWAINSON.

Lampornis SWAINS., Zool. Jour., III, 1827, 358. Type, *Trochilus mango* LINN.

Anthracothorax BOIE, Isis, 1831, 546. Type, *Trochilus nigricollis*, VIEILL.

Smaragdites BOIE, Isis, 1831, 547. Type, *Trochilus dominicus* LINN.

Floresia REICH., Aufz. Colib., 1853, 11 (subgenus). Type, *Trochilus porphyurus* SHAW, = *T. mango* LINN.

Hypophania REICH., Aufz. Colib., 1853, 11 (subgenus). Type, *Trochilus dominicus* LINN.

Margaroichrysis REICH., Aufz. Colib., 1853, 11. Type, *Trochilus aurulentus*, Vieill. = *T. dominicus* LINN.

Endoxa HEINE, J. f. O., 1863, 179. Type, *Trochilus porphyurus* SHAW. (Substitute for *Floresia* REICH!.)

GENERIC CHARACTERS.—Size large (wing, 2.50 or more); tail large, slightly rounded, double rounded, or emarginate, considerably more than half as long as wing, the feathers broad, with rounded tips, their color mainly chestnut, glossed with purple, or bright purple (blackish green in *L. viridis*); wing ample, the primaries of normal shape; bill longer than head, slightly curved, its vertical thickness least through the middle; nasal opercula partly feathered; greater part of tarsi naked.

*Brewster, the Auk., vol. VII, p. 211.

†The Auk, vol. III, 1886, p. 432.

The species of *Lampornis* are about ten in number (including subspecies), and belong chiefly to the West Indies and the Atlantic coast district of tropical America; four of them, *L. dominicus* (Linn.), *L. viridis* (Vieill.), *L. mango* (Linn.), and *L. ellioti* Cory, are restricted to the West Indies; the same number are continental; one which is merely an insular race of a continental species is confined to the Caribbean island of Old Providence, while one (*L. calosoma* Elliot) is of unknown habitat.

The Central American forms may be distinguished by the following characters:

COMMON CHARACTERS.—Adult males bronze-green above; tail (except middle feathers) bright chestnut-purple, glossed with violet-purple, the feathers margined terminally with blue-black; lower parts greenish, with or without a broad black throat-stripe. *Adult females* with lower parts mainly white, but with a median stripe (broadest on throat) of black or green; tail-feathers (except middle pair) bluish or greenish black terminally or subterminally, their tips often white.

a¹. Throat-stripe opaque velvety black.

b¹. Black of throat continued backward to belly. *Hab.*, Panama to Brazil.

L. nigricollis (VIEILL.). *Black-throated Humming Bird* (Page 377.)

b². Black of throat not extending beyond chest.

c¹. Bill longer (culmen 0.90 or more). *Hab.*, Southern Mexico to Costa Rica.

L. prevosti (LESS.). *Prevost's Humming Bird*.*

c². Bill shorter (culmen, 0.78). *Hab.*, Old Providence Island, Caribbean Sea.

L. prevosti hendersoni (CORY). *Henderson's Humming Bird*.†

a². Throat-stripe (female) or whole throat (male) brilliant green. *Hab.*, Veragua.

L. veraguensis GOULD. *Veragua Humming Bird*.‡

The first of the above-characterized species has been included in several works on North American birds, on the strength of a specimen that was given to Mr. Audubon by Dr. Bachman, who received it from their "mutual friend, Dr. Strobel," who claimed to have obtained it at Key West, Florida. If the specimen was really obtained at Key West, its occurrence there must be considered as purely accidental, since it is not even found in the West Indies, nor along the Central American coast, but is a South American bird, with the Isthmus of Panama as its normal northern limit.

BLACK-THROATED MANGO HUMMING BIRD. *Lampornis nigricollis* (VIEILL.).

Trochilus nigricollis VIEILL., Nouv. Dict. Hist. Nat., VII, 1817, 349.

Lampornis nigricollis VON BERLEPSCH, J. f. O., 1884, 309.

Trochilus mango AUD., Orn. Biog., II, 1834, 480, pl. 184; B. Am., IV, 1842, 186, pl. 251 (not of LINNAEUS).

Lampornis mango GOULD, Mon. Troch., pt. XII, 1856, pl. 12; vol. II, 1861, pl. 74.—B. B. and R., Hist. N. Am. B., II, 1874, 440.

* *Trochilus prevosti* LESS., Hist. Nat. Col., 1831, 87, pl. 24.—*Lampornis prevosti* GRAY, Gen. B., I., 108.

† *Lampornis hendersoni* CORY, The Auk, IV, July, 1887, 177.

‡ *Lampornis veraguensis* GOULD, Mon. Troch., pt. XV, May, 1858, pl. 9; vol. II, 1861, pl. 76.

The Mango (GOULD).

Mango Humming Bird (AUDUBON).

Black-throated Humming Bird (COUES).

Le Lampornis mango (MULSANT and VERREAUX).

RANGE.—Northern South America, from the Isthmus of Panama to Brazil and eastern Peru; accidental at Key West, Florida?

SP. CHAR.—*Adult male* golden green above, middle tail-feathers darker; rest of tail rich chesnut, glossed with purple, the feathers broadly margined at ends with purplish black; median portion of body beneath opaque black, the lateral portions metallic blue anteriorly, bronze-green posteriorly. *Adult female* with median under parts black, bordered along each side by white; tail-feathers more extensively black terminally, the three outermost often with whitish tips.

Adult male (No. 119368, Panama, 1862; J. McLeannan): Above bronze-green, darker and less bronzy on top of head; middle pair of tail-feathers dull greenish black; other rectrices deep purplish chestnut, richly glossed with metallic violet, each feather broadly margined terminally with glossy blue-black, and with the shaft clear chestnut; outer feather with outer web broadly edged with purplish black; remiges dusky, very faintly glossed with purplish. Chin, throat, chest, and middle line of breast and belly opaque velvety black, that of the chin, throat, and chest bordered laterally by a band of metallic blue, gradually passing into green on the sides of the neck; sides and flanks bronze-green; under-tail coverts dark metallic green, the basal portion of the feathers dusky; downy tufts between flanks and rump, pure white. Bill black, feet dusky. Length, skin, 4.10; wing, 2.60; tail, 1.45 (middle feathers, 1.35; exposed culmen, 0.85).

Adult female (No. 2702, "South America;" J. Cassin): Top of head dull grayish brown, glossed with bronze-green; rest of upper parts bronze-green, mixed with golden bronze; middle tail feathers dull bottle-green, with dusky tip; next feather with outer web similar, but inner web dull blue-black for terminal half and greenish dusky basally, with a small spot of chesnut about one-third the distance from the tip; next with more than the basal third green on outer web, dusky on inner, the remaining portion blackish terminally and laterally, the central portion occupied by a broadly lanceolate patch of chestnut, about 0.50 of an inch long, the extreme tip of the feather white; next feather similar, but chestnut patch and white terminal spot both more extensive, the latter passing into rusty anteriorly; outer feather chestnut, with base, broad margin to outer web, and still broader terminal margin of inner web (both reaching nearly to the shaft near end of the feather) black, the tip dull whitish and the shaft nearly pure white. Sides of head similar to top, but darker; chin, sides of throat, and malar region, together with breast and belly (except along median line), white; a velvety black stripe extending from upper part of the throat along median line of under surface as far as the lower belly; sides of neck bright

bronze-green, the sides of the body (from breast to flanks) similar, but more bronzy; under tail-coverts bronze-green, margined terminally with pale grayish; bill and feet dusky. Length, skin, 4.25; wing, 2.55; tail, 1.50 (middle feathers, 1.40), exposed culmen, 1.00.

Immature birds (both sexes?): Resemble the adult female, but have the feathers of the upper parts tipped with pale dull buffy, and the white bordering the black median stripe of the under parts sometimes mixed with light brown.*

Nestlings: "At a very young age the upper surface is bronzy green; the under surface white, spotted down the sides of the neck and body with chestnut-red, the spots being arranged in a double line from the angle of the lower mandible, and leaving a line of white between them and the eye."

This is a very abundant species in northern South America, but does not occur, so far as known, north of the Isthmus of Panama. It was introduced as a North American bird, however, by Mr. Audubon, on the strength of a specimen given him by Dr. Bachman, which was alleged to have been taken by Dr. Strobel at Key West, Florida. If the specimen in question was really taken at Key West, its occurrence there must of course have been purely accidental.

The circumstances attending the case are thus given by Mr. Audubon:

It affords me great pleasure to introduce to the lovers of natural history this species of Humming Bird as an inhabitant of the United States. The specimen which is now in my possession was obtained by Dr. Strobel at Key West in East Florida. He informed me that he had succeeded in capturing it from a bush where he had found it seated, apparently wearied after its long flight across the Gulf of Mexico, probably from some of the West India Islands or the coast of South America. Whether this species is numerous in any part of Florida, I have no means of ascertaining. The interior of that territory, as its name indicates, is the land of flowers, and consequently well suited to the peculiar habits of this genus; and as it has seldom been visited by ornithologists it is possible that not only this, but several other species of Humming Birds, may yet be discovered as inhabitants of our southern country.

Genus **ATTHIS** REICHENBACH.

Atthis REICH., *Aufz. der Colib.*, 1853, 12. Type, *Ornysmia heloisa* LESS. and DELATTE.

GENERIC CHARACTERS.—Similar to *Stellula*, but tail-feathers not inclining to spatulate form, the outer two or three broadly tipped with white in both sexes; feathers of gorget in male broader and without white bases.

The only two known species of this genus are very much alike in general appearance, but may be distinguished by the following characters:

COMMON CHARACTERS.—Exposed culmen not more than 0.50; outer tail-feathers broadly tipped with white in both sexes. *Adult males*

* According to Gould "the young male is similar to the female, but has the white on each side the neck suffused with chestnut."

bronzy green or bronzy above, the middle tail-feathers broadly edged with rufous on inner web, the other tail-feathers with basal half rufous, then purplish black, the two or three outermost broadly tipped with white; gorget rich metallic purplish; chest and other median lower parts white, the sides and flanks rufous, tinged or spotted with greenish or bronzy. *Adult females* similar to males, but throat dull white, spotted with dull greenish or bronzy; under tail-coverts pale rufous; four middle tail-feathers without rufous edgings.

a¹. *Adult male*: Outer primary narrow, abruptly attenuated at tip; gorget brilliantly metallic reddish violet, with decided violet tints in certain lights. Culmen, 0.48–0.50. *Hab.*, Eastern Mexico.

A. heloisa (LESS. and DE LATTR.). *Heloise's Humming Bird*. (Page 380.)

a². *Adult male* with outer primary broad, not attenuated at tip; gorget metallic reddish purple, without violet tints; otherwise much like *A. heloisa*. Culmen, 0.38–0.40. *Hab.*, Highlands of Guatemala. *A. ellioti* RIDGW. *Elliot's Humming Bird*.*

A. heloisa has been included in works on North American birds published since 1870, on the strength of a specimen erroneously identified as this species, collected by Mr. J. H. Clark, of the United States and Mexican Boundary Survey, at El Paso, Texas.† It is a species of eastern Mexico, where it inhabits the tropical coast district (and perhaps the temperate slopes also), and may be expected to occur within our limits along the lower Rio Grande.

HELOISE'S HUMMING BIRD. *Atthis heloisa* (LESS. and DE LATTR.).

(Plate XLVI.)

Ornismya heloisa LESS. and DE LATTR., Rev. Zool., 1839, 15.

Selasphorus ? heloise GOULD, Mon. Troch., pt. VIII, 1854, pl. 2; vol. III, 1861, pl. 141.

Atthis heloise GOULD, Introd. Troch., oct. ed., 1861, 89.—COOP., Orn. Cal., I, 1870, 361.—B. B. & R., Hist. N. Am. B., II, 1874, 465, pl. 47, fig. 6.

Heloisa's Flame-bearer (GOULD).

L'*Atthis d'Héloïse* (MULSANT and VERREAUX).

Chupamirto de peto violado purpúreo (D'OCA).

RANGE.—Eastern Mexico.

SP. CHAR.—*Adult male*, with gorget rich metallic magenta-purple, with steel-blue reflections, the feathers much elongated posteriorly and laterally; tail feathers all extensively rufous basally, the three outer ones tipped with white and with a subterminal black patch; length about 2.70–2.75; wing, 1.30–1.50; tail, 0.95–1.10; exposed culmen, 0.45–0.50. *Adult female*, similar to the male above, except that the middle pair of tail-feathers are without any rufous, while that on the other rectrices is much more restricted; chin and throat white (tinged with rusty laterally), spotted with bronze; chest and middle line of breast and belly dull white; sides and flanks cinnamon-rufous; under tail-coverts cinnamon-buff; length (skin), 3.25; wing, 1.40; tail, 0.80; exposed culmen, 0.48.

* *Atthis ellioti* RIDGW., Proc. U. S. Nat. Mus., I, July 1, 1878, 9.

† See The Auk, Jan., 1891, p. 115.



HELOISA'S HUMMING BIRD (*Atthis heloisa*).

Male. (Cat. No. 24616, U. S. N. M. Xalapa, Mexico. Collected by R. Montes de Oca.)

Female. (Cat. No. 24618, U. S. N. M. Xalapa, Mexico. Collected by R. Montes de Oca.)

Adult male (No. 24616, Jalapa, Mexico; Dr. A. L. Heermann): Above metallic greenish bronze, strongly tinged with golden bronze on hind-neck, back, scapulars, and rump; remiges dusky, very faintly glossed with purplish; middle pair of tail-feathers bronze-green, the basal portion cinnamon-rufous, this most distinct on edges (broadly) where continued half-way to the tip; next pair of feathers cinnamon-rufous, tipped with a guttate spot of purplish black, this preceded by a broad, V-shaped patch of metallic bronze-green; remaining rectrices broadly tipped with white and crossed by a broad, subterminal patch of purplish black, the basal portion of all light cinnamon-rufous. Ear-coverts grayish brown or olive; gorget, including chin, malar region, and entire throat, brilliant metallic magenta-purple, with steel-blue and even greenish reflections; the more posterior, and especially the postero-lateral, feathers much elongated (the longest extending nearly 1.00 inch from the chin-angle), the individual feathers rather narrow but with rounded tips; chest, breast, belly, and under tail-coverts white; sides and flanks light rusty, glossed in places with golden bronze; bill and feet black; length (skin), 2.75; wing, 1.50; tail, 0.95; exposed culmen, 0.50.

Adult female (No. 24618, Jalapa, Mexico; Dr. A. L. Heermann): Above bright metallic bronze-green, tinged with golden bronze, duller on top of head; remiges dusky, with faint purplish reflections; middle pair of tail-feathers metallic green, passing into blackish at tips, but without rufous at base; next pair with a terminal spot of light cinnamon, then purplish black for about 0.22 of an inch, the remaining portion cinnamon-rufous, with a small space of green between this color and the black, on the outer web; next feathers similar, but terminal spot whitish instead of cinnamon, with black more extensive and only a trace of the green space; next, similar, but terminal spot pure white and a little larger; outer feather similar to the second, but white spot a little larger, and basal portion much duller, as well as paler, rusty. Chin and throat white, tinged with pale rusty laterally, spotted with bronzy brown; chest plain white; sides and flanks cinnamon-rufous, the belly whitish; lower tail-coverts cinnamon-buff; bill and feet black; length (skin), 2.85; wing, 1.40; tail, 0.85; the outer feathers 0.10 shorter; exposed culmen, 0.48.

The specimen from El Paso, Texas, referred to in the "Ornithology of California," "History of North American Birds," and subsequent works as being this species, proves to be a young example of *Stellula calliope*. (See *The Auk*, January, 1891, p. 115.)

Genus **AGYRTRIA** REICHENBACH.

Thaumatias BONAP., Rev. et Mag. Zool. 1854, 255 (*nec* ESCHOLTZ, 1829).

Thaumatias GOULD, Introd. Troch. oct. ed. 1861, 151 (*nec* BONAP., 1850).

Aggyrtia REICH., Troch. Enum. 1855, 7. Type, *Trochilus brevirostris* LESS.

Leucodora MULS., Hist. Nat. Ois. Mouch. i, 1873, 309. Type, *Trochilus norrisii* BOURC.

GENERIC CHARACTERS.—In what the characters of this supposed genus really consist, I have not been able to discover, either by a careful examination of specimens or by consulting the various works which recognize it. The various species referred to *Aggyrtia* are essentially identical in structure with the species referred to *Amazilia*, and in my opinion should be placed in the same genus with them. Other so-called genera, as *Uranomitra*, *Timolia*, *Eucephala*, *Arinia*, and *Callipharus*, are also involved in the uncertainty. (See p. 362.)

Taking the single species which has been mentioned as a North American bird, together with all the Central American species which have been placed in the same so-called genus, we have four species of *Aggyrtia* whose differential characters are as follows:

*a*¹. Throat and breast green.

*b*¹. Outer tail-feather blackish, with dusky gray tip. *Hab.* Tobago, Trinidad, and Venezuela to Brazil; accidental in Massachusetts?

A. tobaci (GMEL.) Tobago Humming Bird. (Page 382.)

*b*². Outer tail feather bronzy green, with dark purplish bronze subterminal band and gray tip. *Hab.* Honduras. *A. luciae* (LAWR). Lucy's Humming Bird.*

*a*². Throat and breast white.

*b*¹. Belly pure white, flanks green. *Hab.* Mexico to Nicaragua.

A. candida (BOURC. and MULS.). White-breasted Humming Bird.†

*b*². Belly and flanks pale rufous. *Hab.* Mexico.

A. norrisii (BOURC.). Norris's Humming Bird.‡

TOBAGO HUMMING BIRD. † *Aggyrtia tobaci* (GMEL.).

Trochilus tobaci GMEL., S. N. I., 1788, 498.

Aggyrtia tobaci ELLIOT, Class. and Synop. Troch., 1879, 206.

Thaumatias linnæi GOULD, Mon. Troch., pt. XII, 1856, pl. 4, vol. v, 1861, pl. 302. —B. B. and R. Hist. N. Am. B., II, 1874, 468. §

Aggyrtia linnæi COUES, Key, 1872, 186.

Trochilus maculatus VIEILL., Ois. Dor., I, 1802, 87, pl. 44.

Aggyrtia maculata CAB. and HEINE, Mus. Hein., III, 1860, 33. —MAYN., B. E. Mass., 1870, 128 (Cambridge, Mass.). —ALLEN, Am. Nat., III, Feb., 1870, 645 (do.).

Linnaeus's Emerald (GOULD).

Le *Thaumatias* de Linne (MULSANT and VERREAUX).

Linné Humming Bird (COUES).

* *Thaumatias luciae*, LAWR. Pr. Ac. Nat. Sci., Phil., 1867, 233. *Aggyrtia luciae*, ELLIOT, Class. and Synop. Troch., 1879, 208.

† *Trochilus candidus*, BOURC. and MULS., Ann. Soc. Ag., Lyons, ix, 1846, 326. *Aggyrtia candida*, CAB. and HEINE, Mus. Hein., iii, 33.

‡ *Trochilus norrisii*, BOURC., P. Z. S., 1847, 47. *Aggyrtia norrisii*, ELLIOT, Class and Synop. Troch., 1879, 204.

§ Not *Thaumatias linnæi* BONAP., Rev. et Mag. Zool., 1854, 255, based on *Trochilus thaumatias* LINN. (S. N. ed., 12, I, 1766, 190), which is certainly not this species.

RANGE.—Tobago, Trinidad, Venezuela, Guiana, and northern Brazil; accidental in eastern Massachusetts (?)

SP. CHAR.—*Adult* (No. 88468, U. S. National Museum, Surinam; Count von Berlepsch): Above dark bronze-green, including two middle tail-feathers, the latter, however, much duller green than the back; remiges dusky, very faintly glossed with purplish; outer tail-feather dusky, inclining to blue-black subterminally, the tip dusky gray for about .20 of an inch; next feather similar, but with the dusky grayish tip much less distinct, and the outer web slightly glossed with dull bronze-greenish, except for terminal third; next feather with dusky gray tip reduced to a narrow terminal margin, and the outer web distinctly dusky bronze-greenish, except terminally; fourth feather similar, but no trace of grayish at tip. Malar region, chin, throat, and chest, bright metallic emerald-green, more yellowish green laterally, the feathers of the chin and throat dusky grayish at base, with a white bar between the dusky and the green, those of the chest dusky immediately beneath the surface; breast, sides, and flanks bronze-green; sides of belly similar, but feathers margined with pale grayish or grayish white; middle line of belly (narrowly) white; downy femoral tufts pure white; under tail-coverts brownish gray, broadly margined with white. Upper mandible black; lower pale yellowish brown (pinkish in life), becoming blackish at tip; feet dusky. Length (skin), 3.90; wing, 2.15; tail, 1.20 (outer feathers a little shorter); exposed culmen, 0.80.

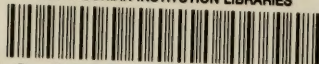
A specimen of this species is in the collection of Mr. William Brewster, which is said to have been taken in the vicinity of Cambridge, Massachusetts, in August, 1865. If it were really taken there, its occurrence must of course be regarded as purely accidental. (See remarks on page 313.)







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